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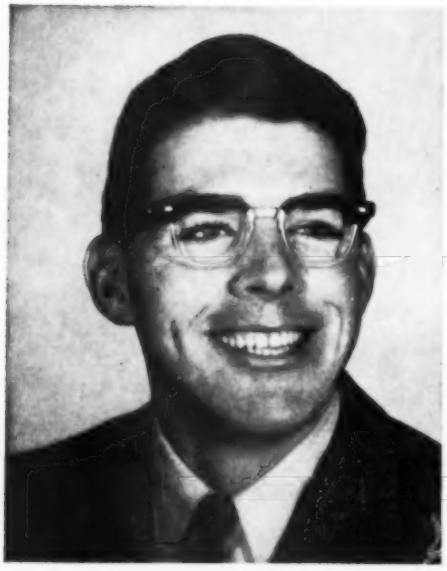

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[1] CLIFTON, C. E. AND HALL, N. C. "RE-STERILIZING ACTIVITY OF CERTAIN CONTACT LENS SOLUTIONS," CONTACTO, THE CONTACT LENS JOURNAL, 3:10, 301-2, 1959.

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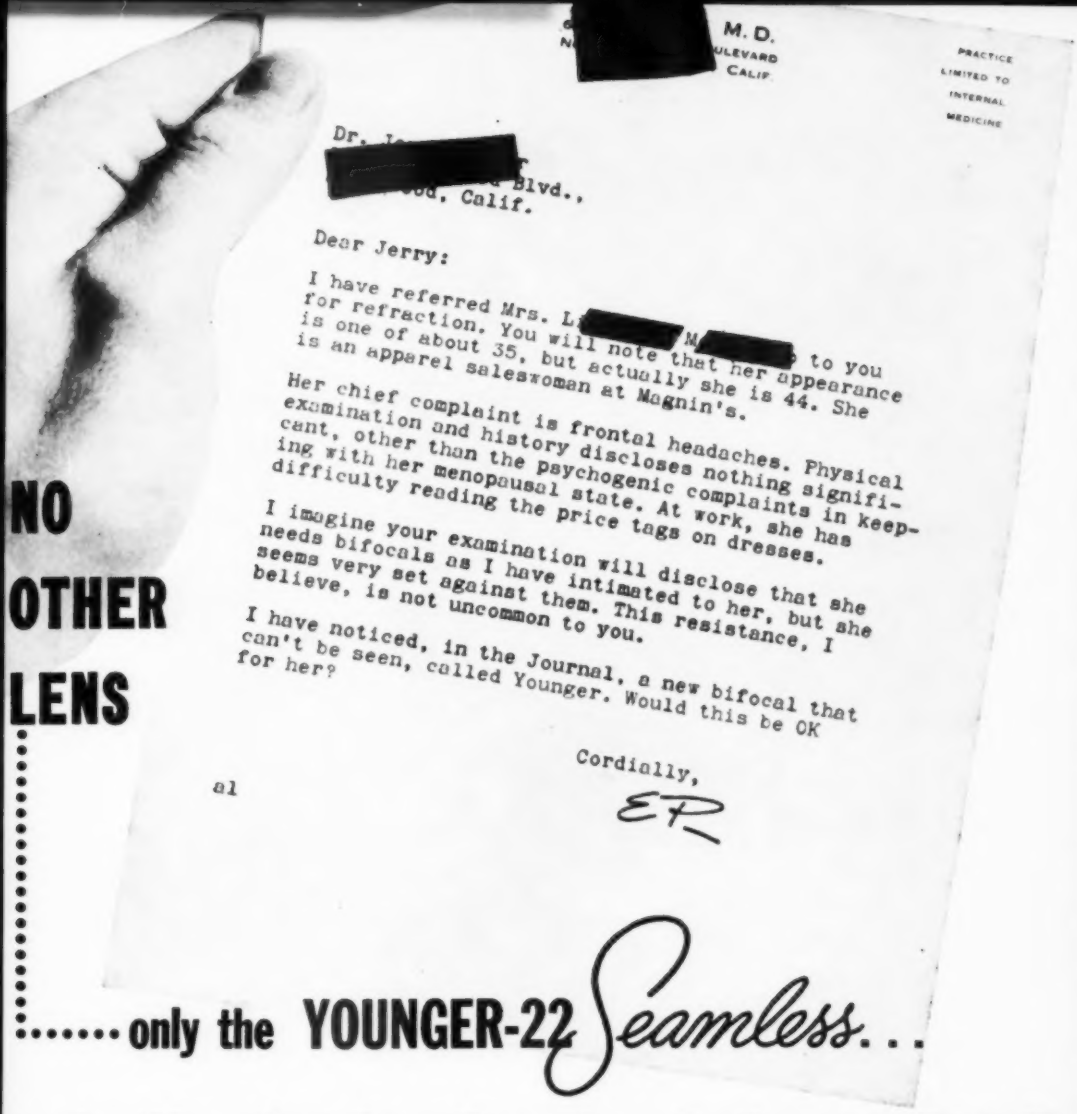
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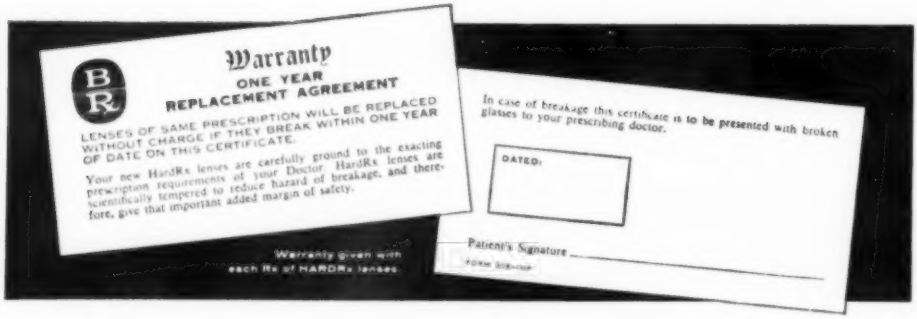
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RELATIONSHIP OF REFRACTIVE ERROR TO BOOKISHNESS AND ANDROGYNY*

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School of Optometry, University of California
Berkeley, California

In 1932 approximately 200 members of the fifth grade in five elementary schools in Oakland, California, were enrolled in what has become known as "The Oakland Growth Study." For the next seven years this representative group cooperated in an intensive program of physical, physiological and psychological measurements at The Institute of Human Development of the University of California, under the direction of Dr. Harold E. Jones. In addition, the staff psychologists of the Institute had many opportunities to observe members of this group in playground and other non-directed activities. A systematic record of social behavior and interaction was compiled. Interviews with mothers were designed to bring additional information about home and neighborhood and about the family regime and parent-child relationships.

The war followed shortly after this group was graduated from high school. As a result, contacts were temporarily lost. Between 1948 and 1953, however, it proved possible to undertake a new series of interviews, and in 1954 a grant from the U. S. Public Health Service led to a renewal of the physical and physiological program under the direction of Dr. Hardin Jones.[1]

The School of Optometry cooperated in The Oakland Growth Study in 1934 and 1935. When the physical and physiological studies were renewed in 1954, the School of Optometry again cooperated. As a consequence, data are available as to the refractive and visual changes which occur in a non-visually selected sample from age 13 (average) to age 34. It is possible to correlate these refractive findings with other physical, physiological and psychological data gathered independently.

The first report of the changes in visual function was published in 1958.[2] At the time of the 1958 report, some 51 women and 44

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†Optometrist, Ph.D., Professor of Physiological Optics and Optometry, Fellow, American Academy of Optometry.

men had been examined both in 1934 and 1954-58. The refractive error was reported in terms of the error in the 90° and 180° meridians rather than in terms of the more usual equivalent sphere. The mean error and the standard deviation for these two meridians for 1934 and 1954 are given in Table 1 for both females and males.

TABLE 1

	Mean 90°		Mean 180°		S.D. 90°		S.D. 180°	
	female	male	female	male	female	male	female	male
1934	+0.03	+0.42	+0.15	+0.37	±1.08	±0.56	±1.03	±0.54
1954	—0.25	+0.39	—0.01	+0.31	±1.57	±0.93	±1.46	±1.02
Change	—0.28	—0.03	—0.16	—0.06	±0.49	±0.37	±0.43	±0.48

The change in the refractive power of the vertical meridian in female subjects was found to be significant at the 5 per cent confidence level. In contrast, the differences in the horizontal meridian in females and both meridians in males was found not to be significant at the 5 per cent level by the "t" test. The increase in variance was found to be significant by the "F" test in every case except the horizontal meridian in females. The differences between female and male subjects was also found to be significant.

Since the 1958 report was made, the sample sizes have been increased to 59 females and 52 males. In order to make the data more comparable with other studies and to obtain the advantage of having the error represented by a single number, the errors have been recalculated in terms of the mean equivalent sphere. This was determined by calculating the equivalent sphere for each eye. These were then added and the result was divided by two. The data obtained at the first examination in 1934 will be called the 1934 data and that

TABLE 2

	Mean Sph. Equiv.		Standard Deviation	
	Female	Male	Female	Male
1934	+0.118 D.	+0.289 D.	±1.06 D.	±0.48 D.
1954	+0.062 D.	+0.319 D.	±1.49 D.	±1.06 D.
Diff:	—0.056 D.	+0.030 D.	±0.97 D.	±0.93 D.

obtained in the period 1954-1958 will be called the 1954 data. The mean values and the standard deviations are given in Table 2 in terms of the mean equivalent sphere.

None of the differences in mean values given in Table 2 are significant at the 5 per cent level by the "t" test. The increase in variance of the data from 1934 to 1954 is significant for both females and males. The greater variance for females as compared to males is significant except that for the change in refractive error. Thus the major change which took place, in terms of the equivalent sphere, in twenty plus

years was an increase in the dispersion of the refractive errors in both females and males. This dispersion was greater in females than in males. The changes are shown graphically in Figure 1, for the 95 per cent confidence limits of the mean.

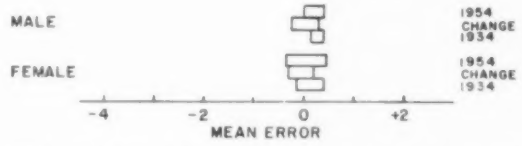

Fig. 1. The 95% confidence limits for the mean of the refractive error determined in 1934, 1954, and the change in error for males and females.

TABLE 3

	1934 Number			1954 Number		
	Myopes	Hyperopes ≥0.50		Myopes	Hyperopes ≥0.50	
Male	6	11	9	+50%	25	+127%
Female	11	12	19	+73%	25	+108%

Table 3 gives the number of individuals who were myopic to any degree and hypermetropic more than 0.50 D. The actual number of myopic individuals increased but, just as important, the number of individuals with hypermetropia greater than 0.50 D. also increased. The dispersion is further exemplified by the increase in the total range of error. For example, in 1934 the total range for male subjects was 3.25 D. while in 1954 it was 6.50 D. The change in the range of error for females was less than that for males; the range in 1934 was 8.00 D. and in 1954 it was 9.50 D.

There has been considerable discussion in the literature as to the relationship between myopia and prolonged near work, particularly during adolescence. Nearly all degrees of correlation have been found. For example, Young[3a] states, "Taken together the partialled total group correlation and the correlation within age groups indicate that there is a significant though small relationship between refractive error and hours of reading. These results were obtained on small groups using a cross sectional approach." His data tend to support the statement. "The correlation coefficient although low supports the conclusion that minus refraction is associated with increased time spent in reading."[3b] In contrast, Nadell, Weymouth and Hirsch[4a] state, "Analysis of the data fails to reveal any relationship between the amount of reading done and the distribution of the refractive state in the present sample.

Some investigators[5, 6] agree with Young that there is a relationship between near work and refractive error but the relationship emphasized is not between myopia and reading but rather the reverse: the relationhip between hypermetropia and avoidance of reading.

Nadell, Weymouth and Hirsch[4b] remarked, "Longitudinal, rather than cross-sectional, studies of the development of the refractive state are needed." The Oakland Growth Study offers an excellent opportunity to note changes which occur in a sample group over a period of some 21.01 ± 1.22 years. The average age at the time of the first examination was 13 and at the time of the last, 34. As already mentioned, in addition to the refractive data, many other physical, physiological and psychological factors for the individuals in this group are known. Unfortunately, the exact time sequence of the changes in refraction cannot be stated as precisely as can the time sequence for other types of changes. As noted, the Oakland Growth Study was started January 1, 1932, which can be designated as zero on the time scale. January 1, 1933, would be 1.0, January 1, 1934, would be 2.0, etc. The first refraction took place at 2.29 ± 0.14 years after the start of the project, the second at 3.20 ± 0.22 years after the start, and the third at 23.30 ± 1.22 years after the start. The greater standard deviation on the time scale for the last examination probably has no serious consequence since the refractive condition is probably fairly stable in subjects at this age (33-36).

One of the factors determined for these individuals was "bookishness." A staff member of the Institute, who also served as educational counsellor for all members of the group in junior and senior high school, estimated the degree of "bookishness" for most individuals included in the study. The counsellor was well acquainted with the subjects with respect to their school and study habits and with respect to their leisure-time activities. He also had available all the psychological data and the results of interviews with subjects and with mothers. He did not, however, know the refractive data and at the time the ratings were made, had no idea that bookishness might be related to refractive error.

The individuals were rated on a five point scale from least bookish (1) to most bookish (5). This rating was made to describe the degree of bookishness during adolescence; namely, while the individuals were in junior and senior high school, grades 7 to 12, or roughly for the ages 13 to 18. The degree of bookishness was not necessarily based on whether the individual was a good or poor reader but rather on whether the individual was or was not fond of reading and whether

or not the individual spent a good deal of time reading.

The information available for this group thus offers an opportunity to test the hypothesis that "bookishness" and refractive error are related. More important, it offers an opportunity to note any relationships which might exist between bookishness and change in refractive error.

In the previous report[2] on this same group, it was noted that there were significant differences in refractive error of females as compared with males. As noted in this report, the differences in the means disappears when the refractive state is expressed in terms of the equivalent sphere but the differences in the variances still exist (see Figure 1).

In addition to bookishness, most of the individuals in the group were rated on the pattern of their body form during their 18th year. This rating was made by four trained observers at the Institute and resulted in an Androgyny Score on a scale from 8 to 40. The rating was made on the basis of surface modeling, shoulder girdle, waist line, hip flare, buttocks, thigh form, leg interspace, and muscle bulge. In addition, a characteristic description for each individual was established: hypermasculine; masculine; intermediate, bisexual, asexual, or disharmonious; feminine; or hyperfeminine. In general, an Androgyny Score between 8 and 12 established the individual as hypermasculine; between 13 and 19, masculine; between 20 and 25, intermediate; between 26 and 30, feminine; and 35 and 40, hyperfeminine.

If the factors which determine refractive error are in part physical and physiological, it might be suspected that there might be some relationship between androgyny and refractive error similar to that found between the refractive error of males and that of females.

The bookishness rating and the androgyny scores are numbers on an ordinal or ranking scale rather than numbers on an interval scale. An ordinal scale is one in which factors can be measured in terms of equality or one factor may be said to be greater than or less than another, but it does not allow for the determination of a ratio between factors. For example, the bookishness scale used varied between 1 for the least bookish to 5 for the most bookish. It is possible to state that those given a bookishness rating of 2 were more bookish than those given a rating 1, but it is not possible to state that those individuals given a rating of 2 were twice as bookish as those given a rating of one. As a consequence, it was decided to use nonparametric statistical methods in the analyses of the several relationships to be investigated, if the variable was either bookishness or androgyny. Specifically, the tests utilized were the Mann-Whitney U test, the Kruskal-Wallis one-

way analysis of variance, and the Spearman rank correlation coefficient.[7] These methods have an additional advantage in that one individual with an extreme measurement or rating does not influence results as much as is the case when parametric methods are used. For example, one female subject had a refractive error slightly in excess of 6.00 D., both in 1934 and 1954. This one individual weighted the mean error for females toward myopia to a considerable extent. If she had been omitted from the sample, the mean error in 1934 would have been +0.228 D. rather than +0.118 D. as found; and in 1954 it would have been +0.168 D. rather than +0.062 D. The median error for all the females was +0.255 D. in 1934 and +0.311 D. in 1954. If this highly myopic individual were omitted the medians would have been +0.277 D. in 1934 and +0.333 D. in 1954.

RESULTS: RELATIONSHIP REFRACTIVE ERROR AND BOOKISHNESS

FEMALES

In order to test the relationship between refractive error and bookishness, the first two groups were combined since there were only three individuals in each. Thus there were four "bookishness" groups with 6 individuals in group 1, 18 in group 2, 14 in group 3, and 6 in group 4. Such combining of data is possible since an ordinal scale was used.

These four groups, divided on the basis of bookishness, were then tested by means of the Kruskal-Wallis test in order to determine the probability that the groups were drawn from the same population with regard to refractive error. The results are given in Table 4.

TABLE 4

Year	Probability
1934	0.95
1954	0.02
Change	0.01

Inspection of Table 4 indicates that there is a strong probability that there is a real difference between the various bookishness groups as far as refractive error is concerned in 1954, but that there was no difference in 1934. This conclusion is also borne out by a significant difference in the change in error between 1934 and 1954. Some idea of the type of change in error associated with each bookishness group can be obtained from the median error for each, as shown in Table 5

The mean change for the individuals in group one was +0.91 D. with a standard deviation of ±0.47 D. while the mean change in group 4 was —0.67 D. with a standard deviation of ±1.49.

The reverse situation was tested by the Kruskal-Wallis test by dividing the female subjects into four groups depending on the change

TABLE 5

Groups	1	2	3	4
1954	+1.01	+0.25	+0.02	—0.02
Change from 1934	+0.70	+0.10	—0.15	—0.10

TABLE 6
REFRACTION CHANGE

Bookishness	Myopia 0.75 or more	Myopia 0.01 to 0.74	Hyperopia 0.01 to 0.74	Hyperopia 0.75 or more	#
1	0	0	2	4	6
2	0	6	7	1	14
3	4	4	5	0	13
4	2	1	2	0	5

Note: Zero refraction change omitted.

in refractive error. The females in group one had a change in refractive error of more than —0.75 D.: those in group 2 had a change between —0.01 and —0.74 D.: group 3, between +0.01 and +0.74 D.: and group 4, +0.75 D. or more. The distribution is shown in Table 6. Bookishness rating was then used to test whether these four groups came from the same population. The probability that this was true was found to be 0.01. Consequently, it would appear that individuals divided on the basis of refraction change have different degrees of bookishness.

Various other relations were tested as indicated by the various Null Hypotheses statements listed below:

1. Females who were more myopic than 0.438 D. and those who were more hypermetropic than 0.438 D. in 1934, have the same bookishness rating: Probability by Mann-Whitney, more than 0.05.
2. Females whose refractive error changed by +0.50 D. or more, have the same bookishness rating as those whose error changed by —0.50 D. or more: Probability by Mann-Whitney, 0.01.
3. Females who had a bookishness score of 1 had the same change in refractive error as those who had a rating of 4: Probability by Mann-Whitney, 0.01.
4. Females who were 1.00 D. or more hypermetropic in 1954, had the same bookishness rating as those whose error was between +0.50 D. and —0.50 D.: Probability by Mann-Whitney, 0.005.
5. Females who were 1.00 D. or more myopic in 1954, had the same bookishness rating as those whose error was between +0.50 D. and —0.50 D.: Probability by Mann-Whitney, 0.06.

6. Females who were 1.00 D. or more hypermetropic in 1954, had the same bookishness rating as those who were myopic 1.00 D. or more: Probability by Mann-Whitney, 0.001.

MALES

A similar analysis was made for male subjects using the Kruskal-Wallis test. There were 9 individuals in combined bookishness group 1, 14 in group 2, 10 in group 3, and 8 in group 4. Table 7 gives the results in terms of the probability that each bookishness group is drawn from the same population, as far as refractive error is concerned.

TABLE 7

DATE	PROBABILITY
1934	0.90
1954	0.50
Change	0.95

Inspection of Table 7 indicates that there is no reason to suppose that bookishness ratings of the male subjects divided them into different populations with respect to the mean spherical equivalent refractive error. In order to make certain, the following Null Hypotheses were tested by the Mann-Whitney U test.

1. There was no difference in the bookishness ratings of males who were myopic in 1934 and those who had a 0.50 D. or more of hypermetropia.
2. There was no difference in the bookishness ratings of males who were myopic in 1954 and those who were hypermetropic in 1954.
3. There was no difference in the bookishness ratings of males who were more than 0.49 D. myopic in 1954 and those who were more than 0.49 D. hypermetropic in 1954.
4. There was no difference in the bookishness ratings of males whose refractive error changed in twenty years by more than —0.49 D. and those whose error changed by more than +0.49 D.

No evidence was found that indicated that any of these four hypotheses could be rejected at the 0.05 significance level.

The evidence indicates for males in this sample that there are no relationships between refractive error and bookishness, which cannot be accounted for on the basis of chance.

ANDROGYNY

Female Subjects

The mean androgyny rating for females was 32.7 with a standard

deviation of ±3.3. The range was from 24.8 to 38.3 with a median of 33.0. There was only one female with a rating of 25 or less.

The rank order correlation between androgyny and refractive error change was found to be +0.10. This indicates a slight correlation between high androgyny scores and an increase in hypermetropia or a decrease in myopia. The probability that this relationship was due to chance was calculated as 0.48.

The following six hypotheses were set up to be tested by the Mann-Whitney U test.

1. There was no difference in the equivalent sphere refraction in 1934 between females who had an androgyny rating equal to or less than 29 and those who had an androgyny rating equal to or more than 36.
2. There was no difference in the equivalent sphere refraction in 1954.
3. There was no difference in the refractive error change.
4. There was no difference in the androgyny ratings of females whose spherical equivalent refraction in 1934 was 0.50 D. myopia or more and females whose refraction was 0.50 D. of hypermetropia or more.
5. There was no difference in androgyny ratings when the 1954 error was used with the same limits as in 4, above.
6. There was no difference in androgyny ratings for females whose refractive error changed by —0.50 D. or more and those whose error changed by +0.50 D. or more.

The significance level for these six hypotheses ranged from a low of 0.20 to a high of 0.40. Consequently, there is no reason to reject any of the six statements: thus, any relationship between androgyny and refraction could be due to chance.

Male Subjects

The mean androgyny rating for males was 17.0 with a standard deviation of ±2.8. The range was from 10.6 to 24.6 with a median of 17.0. There were eight subjects who had an androgyny rating of 20.0 or more.

The Spearman rank order correlation between androgyny and the 1954 mean equivalent sphere was found to be +0.27 with a significance of slightly less than 0.05. Thus there seems to be some slight significant positive relationship between high androgyny and hypermetropia.

The following hypotheses were tested by the Mann-Whitney U test.

1. There was no difference in the equivalent sphere refraction in 1934 between males who had an androgyny rating between 11 and 14 and those who had a rating between 21 and 25.
2. There was no difference in the equivalent sphere refraction in 1954 for the same two androgyny groups.
3. There was no difference in the change in refraction for the same two groups.
4. There was no difference in the androgyny rating between males who were myopic and those who were 0.50 D. or more hypermetropic in 1934.
5. There was no difference in the androgyny rating between males who were myopic and those who were 0.50 D. or more hypermetropic in 1954.
6. There was no difference in the androgyny rating between males whose refractive error changed by —0.50 D. or more and those whose error changed by +0.50 D. or more.

The Mann-Whitney U test offers no reasons to reject hypotheses 1, 4, 5, and 6. On the other hand, statement 2 can be accepted at a significance level of 0.05 and statement 3 at a significance level of 0.01. Thus these two hypotheses are probably not true.

The various differences in the change in refraction for males who had an androgyny rating between 11 and 14, and 21 and 25, are shown in Table 8.

TABLE 8

Factor	Androgyny	
	11–14	21–25
N	7	8
Median	+0.06 D	+0.66 D
Range	—3.50 to +1.12	—0.25 to +1.25
Mean	—0.39	+0.62
Std. Dev.	±1.50	±0.52
95% Confidence Limits	—1.89 to +1.11	+0.19 to +1.05

The difference in means was found to have a probability of chance occurrence of 0.10. The change in variance was found to be significant at the 0.01 level. The most obvious difference then between these two groups is the difference in variance. It should be pointed out, however, that this difference is largely due to one fairly myopic male. If this one individual is omitted, the mean error for the low androgyny group would be +0.14 D. and the standard deviation would be ±0.60 D. Under these circumstances the Mann-Whitney U test would be barely significant at 0.05.

DISCUSSION

Bookishness and Refraction

A significant relationship between bookishness and refraction exists only in females. Nadell, Weymouth and Hirsch[5] also found a sex difference between the amount of near work and hypermetropia. They reported that more girls than boys with hypermetropia read a good deal. Their report, however, dealt with the refractive error during adolescence. In the present study there was no relationship between refractive error and bookishness when the girls were 13 years of age. The significant difference occurred with time so that a relationship seemed to have developed both with the refractive error change and the error determined at age 34.

Since refractive errors are measured on a ratio scale (a scale with a true zero), parametric statistics may be used as well as nonparametric. The mean, standard deviation and the standard error for the various degrees of bookishness for females are shown in Table 9 for the change in refraction as well as for the 1954 refraction.

TABLE 9

Group	1	2	3	4
Mean change	+0.91 D.	+0.02 D.	—0.26 D.	—0.67 D.
Std. Dev. change	±0.45	±1.62	±0.98	±1.50
Std. Error change	±0.18	±0.38	±0.26	±0.61
Mean 1954	+0.88	+0.03	—0.26	—1.26
Std. Dev. 1954	±0.59	±1.42	±0.99	±2.74
Std. Error 1954	±0.24	±0.34	±0.26	±1.12

The shift with time is shown in Figure 2 which graphically depicts the spread of refraction for the 95 per cent confidence limits of the means. The certainty of the mean is indicated by this spread. The shift in the mean as well as the increase in variance is indicated.

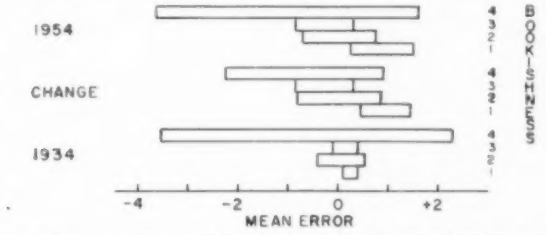

Fig. 2. The 95% confidence limits for the mean of the refractive error of females determined in 1934, 1954, and the mean change in error for various degrees of bookishness. A bookishness rating of 1 indicates a low degree and a rating of 4 a high degree of bookishness.

The change in the mean refraction toward myopia can indicate either that those who were most bookish became more myopic or that those who had a low degree of bookishness were hypermetropic. The shift of the mean value cannot be used to indicate which relationship is most probable. It is possible, however, to make some observations which point to the most likely situation.

Inspection of Figure 2 indicates that along with the shift toward myopia for the two most bookish groups, there was a shift toward hypermetropia for group 1 and virtually no shift for group 2. The increase in variance is also apparent along with the great variance of group 4 in both 1934 and 1954. The only significant change is that which occurred in group 1: in no other case is the change significant at the 0.05 level by the "t" test. Consequently, in the case of females it appears that not only is bookishness related to refractive error but that those subjects with a low degree of bookishness have an increase in hypermetropia with age. In contrast, the myopic increase of the subjects with high degrees of bookishness may be only a chance variation in the mean.

It has already been pointed out that a significant relationship between bookishness and refractive error could not be demonstrated for males. The different attitude of boys and girls in general toward bookishness might account for some of this lack of relationship. Social pressures as well as physical factors might work to reduce bookishness in boys. In girls, the social pressures against bookishness are not great and, consequently, the effects of physical conditions may become the dominant factor. On the other hand, the social pressures in the case of boys may be more dominant and, consequently, the actions of physical factors could be masked.

The refractive changes in males for the various degrees of bookishness are given in Table 10.

TABLE 10

Group	1	2	3	4
Mean change	+0.52 D.	—0.17 D.	+0.08 D.	—0.08 D.
Std. Dev.	±0.58	±1.10	±0.90	±0.47
Std. Error	±0.19	±0.29	±0.28	±0.17
Chance by "t"	<0.05	0.60	0.80	0.70

The only significant change was that which occurred for the individuals in group 1. Thus, even though no significant relationship could be found between bookishness and refractive error, it is apparent that those males with a low degree of bookishness also had a significant increase in their hypermetropia.

The statistical relationships determined here between bookishness and refractive error and refractive error change do not necessarily point to a cause and effect relationship. It could be assumed that individuals with asthenopia might try to avoid reading and other close work in order to avoid subjective distress. There is the clinical experience that uncorrected hypermetropia may result in asthenopia. Hence individuals with uncorrected hypermetropia might avoid reading. This would tend to classify them as having a low degree of bookishness.

The increase in hypermetropia which these individuals demonstrated could be a real increase or it could be due to latent hypermetropia becoming manifest. In either event it would mean that any lens correction which they might have worn should have been changed from time to time in order to keep the hypermetropia corrected. Actually, none of the females in the low bookishness group wore any correction lens before 1952. One male subject wore lenses for about a year in 1944, and another has worn lenses since 1939. Thus with only one exception, these subjects who demonstrated both low bookishness and an increase in hypermetropia were uncorrected.

The type of relationship between bookishness and refractive error in females can be further emphasized by noting that 50 per cent of those in group 4 are not myopic while 100 per cent of those in group 1 are not myopic. Only 25 per cent of all individuals with myopia of 1.00 D. or more are to be found in group 4 while 50 per cent of all individuals with hypermetropia of 1.00 D. or more are to be found in group 1. This high incidence of hypermetropia is indeed remarkable in view of the fact that only 13.6 per cent of all cases are to be found in group 1.

These high relationships are not as marked in the case of males. For example, 22 per cent of the males in group 1 are emmetropic and the balance hypermetropic. Some 44 per cent of all males with hypermetropia of 1.00 D. or more are to be found in group 1.

If the attempt is made to identify those with a low degree of bookishness solely on the basis of refractive error, a limit of 1.00 D. or more of hypermetropia would correctly identify about 50 per cent of all individuals, but a similar test using myopia would correctly identify only 25 per cent of all subjects.

Androgyny and Refraction

In the case of females, as noted above, no correlation between refraction and androgyny was found. This might be due to the fact that, in the present sample, only one of the females had an androgyny score that would classify her in the intermediate group.

The relationship between androgyny and refraction for males indicates that there is a tendency for the hypermasculine males to become relatively more myopic and to develop a greater variance of error than the intermediate androgyny males. This was somewhat unexpected since the reason for determining the relationship between refraction and androgyny was the determination that females tend to be slightly more myopic and to have a greater variance in their refractive error.

As has already been pointed out, the determination may be spurious. If the low androgyny group is limited to those who have a rating of 12 or less and the high group to those who have a rating of 20 or more, the Mann-Whitney U test indicates that the differences in refractive error could be due to chance.

Thus, except for this doubtful finding, androgyny and refractive error as determined both in 1934 and 1954 are independent. The 95 per cent confidence limits for the change in refraction for females and males is shown in Figure 3.

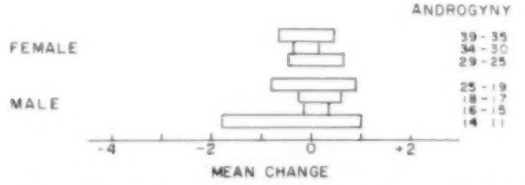

Fig. 3. The 95% confidence limits for the mean of the change in refractive error for various groups divided on the basis of an androgyny score. A low androgyny score indicates a hypermasculine condition and a high score, a hyperfeminine one. A score between 20 and 25 indicates a condition which might be termed intermediate, bisexual, asexual or disharmonious.

SUMMARY

Analysis by both nonparametric and parametric statistics of data obtained on a nonvisually selected sample studied longitudinally for 20 years indicates that for females "bookishness" is related to refractive error. The analysis indicates that the relationship is one between low bookishness and hypermetropia. This was not found for male subjects. An increase in hypermetropia also characterized the low bookishness group for both females and males. Analysis indicated a rather doubtful relationship between androgyny and refractive error in the case of males. Hypermasculine males may be more myopic and may have a greater variance in refractive data than do males with an intermediate androgyny rating.

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ANNOUNCEMENT

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SPONTANEOUS DRAWING AS A VISUAL DIAGNOSTIC AID*

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INTRODUCTION

One hesitates to add an additional test to the already weighty visual examination but additional information is still needed for the testing of the immature, slow developing, brain injured or the pre-kindergarten child. The question often arises, particularly with young children, of whether to correct a low degree of hyperopia or to wait for time to reveal the transitional refractive rate for this child. A spontaneous drawing may give a clue as to whether the child is tending to develop undesirable visual habits or whether his visual space habits are normal. Lens application provided in advance of the expected refractive transition might prevent it from ever appearing.

A spontaneous drawing made by a child prior to receiving spectacles or to receiving visual training and a second drawing made afterward may give a clue as to the visual space value of the spectacles or visual training. A spontaneous drawing may also provide information regarding the visual operational level of the patient. When eye-hand coordination is so poor that the child cannot utilize oblique lines in his drawing without rotating the paper, it is possible that a great deal of monocular fixation training will have to be provided.

Florence Goodenough[1] in summarizing the previous work that had been done in interpreting spontaneous drawings made by young children listed the following:

(1) In young children a close relationship is apparent between concept development as shown in drawing, and general intelligence.

(2) Drawing, to the child, is primarily a language, a form of expression, rather than a means of creating beauty.

(3) In the beginning, the child draws what he knows, rather than what he sees. Later on he reaches a stage in which he attempts to draw objects as he sees them. The transition from the first stage to the second one is a gradual and continuous process.

(4) The child exaggerates the size of items which seem interesting or important; other parts are minimized or omitted.

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(5) The earliest drawings made by children consist almost entirely of what may be described as a graphic enumeration of items. Ideas of number, of relative proportion of parts, and of spatial relationships are much later in developing.

(6) Drawings made by subnormal children resemble those of younger normal children in their lack of detail and in their defective sense of proportion. . . . Not infrequently the same drawing will be found to combine very primitive with rather mature characteristics.

(7) Children of inferior mental ability sometimes copy well, but rarely do good original work in drawing. Conversely, the child who shows real creative ability in art is likely to rank high in general mental ability.

Goodenough[2] makes some further comments which are of value in evaluating drawings:

To the young child, drawing is more akin to talking to himself than to talking to others. It is a way of making his ideas visible. In this sense it is a language. Children draw what they know rather than what they see. . . . The little child does not care whether or not his pictures are beautiful, but he wants them to tell what he has in mind. Details do not trouble him: he goes straight for what is to him the main fact. So if he wants to draw a picture of a man with trousers on he draws the man first and adds the trousers afterwards. The fact that the legs show through the trousers does not trouble him a bit. The man is there, so are his trousers, and who could ask for anything more complete? If he wants to draw a little girl picking flowers in a field he first draws the girl, then the flowers, then, in order to connect the two, he extends one of her arms down to the flowers at her feet in happy disregard of the laws of anatomy. Armholes may seem to be the most important parts of a coat when one is just learning to find his way into them without help, so it is not uncommon to find the armholes drawn with care on a figure that is otherwise completely nude except perhaps for a hat, which as everyone should know is a far more important part of the drawing than is the hair, for hair stays on with no trouble whereas a hat must be looked after. . . . The drawings of bright children are not always or necessarily more artistic than those of backward children, but they excel in such matters as the number of items shown, the correctness with which the parts have been assembled, the relative proportions of the different parts, and in the control of eye and hand movements as shown by the regularity of the lines and the smoothness of their joinings.

In evaluating spontaneous drawings from a visual standpoint we must consider the following factors:

1. *Approach to the task*—

(a) Did a parent have to be present?

(b) Did the child turn to the doctor or parent for aid?

(c) Did the child start at the drawing task easily or was it necessary to make several suggestions as to possible subjects?

(d) Did the child start apologizing about his poor drawing ability before or during the drawing task?

(e) Once the child started the drawing task did he continue until he finished or was it necessary to urge him to finish in order to get him started again after a partial completion of the drawing?

Dependence upon the parent, needing suggestions in order to start his drawing, apologetic viewpoint, frequent starts and stops and wandering of attention all indicate introvertic tendencies or immaturity. Although studies of school children have indicated that the degree of correlation between introversion and myopia is so low as to be almost

zero, it has been the writer's clinical impression that a young child (kindergarten age or younger) with a low amount of hyperopia who exhibits these introvertic tendencies, will usually move faster in the myopic direction than the extrovertic child possessing the same refractive error. It follows then that plus lens support for the young introvertic hyperope may serve as a preventive measure for this myopic drift and may result in an improvement of the child's visual performance.

2. *Motor activity*—These observations of motor overflow, posture variations, effort involved at the task and drawing techniques seem to the writer to provide clues as to the probable refractive conditions to emerge in the future and the level of proficiency of his visuomotor skills.

(a) Does the child grasp the pencil in a normal finger method or does he exhibit the immature palmar grasp? The child having the palmar grasp of the pencil will usually exhibit very poor hand and eye coordination.

(b) What is the amount of effort involved at the drawing task; how hard is he holding the pencil? Are his fingers sweaty as he tries to draw? Is he using a lot of pressure while he draws (frequent breaking of pencil points and pressure of the hand against the paper give clues)? The writer finds that the child performing the drawing task while using a lot of hand pressure and effort will reveal poor performance in doing binocular rotations, binocular fixations and saccadic fixations. If this observation is correct visual training emphasis then should be upon the development of good basic fixation ability.

(c) Shift in working distance—Does the child move to increase his working distance as the task continues or does he move in closer to the task?

(d) Head tilt—Does the child maintain a fixed head tilt or does he have a flexible, normal head posture?

(e) Tension overflow—Does the child wiggle in the chair as he draws? Does he bite on his tongue or the pencil? Does he sit on one leg? Does he swing his leg? In the writers experience the child exhibiting tension overflow almost invariably will reveal inadequate motor movements of the eye. Hence, visual training should emphasize basic pursuit and saccadic fixation training.

The presence of a decreasing working distance as the child performs at the drawing task does indicate to the writer the possibility of a transition into myopia. The presence of a sustained head tilt while performing the drawing task would also indicate the possibility of the

development of anisometropia and/or hyperphoria. Finnegan[3] has reported the increased incidence of visual problems as the child works

TABLE 1

Summary of visual problems in a group of Dallas high school children compared with their habitual near working distance

Ratio between normal visual distance for task and distance at which the children were habitually forced to work*:	Percentage of difficulties in group with this distance ratio:
1.00	15%
1.22	70%
1.65	70%
2.84	79%

$$\text{*Arm-Visual distance ratio} = \frac{\text{Distance on the outside of the arm from middle metacarpal to olecranon}}{\text{Habitual nearpoint working distance}}$$

closer to the writing surface. Table 1 presents the visual data for Dallas school children as abstracted from her thesis. Thus, a child working closer to the drawing than his normal hand-arm distance, could be a sign that visual changes may ensue and therefore preventive measures should be initiated before structural modification of the eye occurs.

3. *Drawing*—In evaluating a spontaneous drawing from the visual viewpoint, at least the following factors should be considered: (a) The position of the drawing. (b) The proportions of the various components of the drawing. (c) The type of lines used in constructing the drawing. (d) The number of objects and their orientation in the drawing. (e) The perspective present in the drawing. (f) The directionality of the drawing.

(a) Positioning. Is the drawing free of the edges of the paper or is it attached to the sides or the bottom of the paper for support? Whenever the child finds it necessary to anchor his drawings it indicates to the writer that the child needs support to aid in his visualization. This lack of ability to draw free of the edges of the paper although it is normal at five years of age, reveals an inefficient visual pattern when performed at six years of age or older. Figure 1 illustrates a visually immature pattern as exhibited by the child's drawing. The patient was a seven year old boy. His distance visual acuity was right eye 20/80, left eye 20/80. His lens correction was as follows: O.D. +8.00 D.S., O.S. +6.00 D.S. Even when drawing the windows this patient had to use the vertical lines (edges of the house) for support. Children exhibiting this characteristic in their drawing will, in the author's experience, usually reveal poor balance and poor visuo-motor skills. They benefit enormously from balance training using a Walking-Rail and a Balance

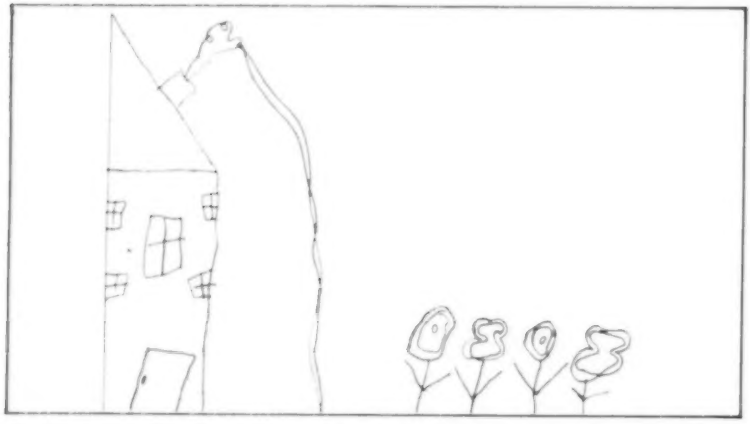

Fig. 1. (Note: All of the drawings referred to in this paper have been reduced from their original size of 9" x 12".)

Board. Simultaneously such patients should receive the basic monocular training procedures of rotations, fixations and accommodative rock.

(b) Proportion—Does the drawing show that the child had an appreciation of relative sizes of various objects? For example, if he has drawn a house, is the door of the proper size in relationship to the total size of the house? Are the windows in proper proportion to the door and the rest of the house? If flowers are present they should be in proper relationship to the size of the house. Figure 1 shows visual immaturity and poor size judgment by the large size of his flowers in relationship to the door.

The total size of the drawing in relationship to the size of the drawing paper also seems to provide a clue as to possible refractive changes to come. The child with hyperopic projection will make large gross drawings (Figure 2), while the child with myopic projection will make small detailed drawings (Figure 3). When C. E. (Figure 2) was asked to tell about his drawing he said, "It's a whale." When I inquired about the missing portion of the whale he explained that you needed a very big sheet of paper to draw a whole whale. On the other hand F. T. (Figure 3) explained her drawing in detail. Thus, if we assume that both of these youngsters are of the same age and each with a low amount of hyperopia, it would seem to the writer highly desirable to prescribe low plus spheres at this time to F. T. to attempt to preserve her hyperopic status. Visual training should be

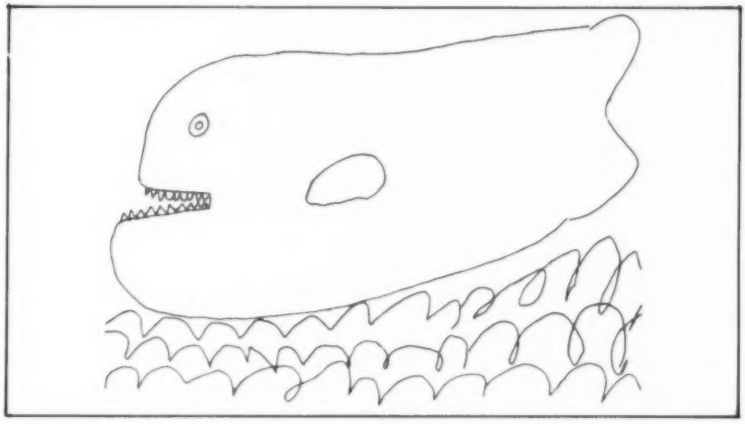

Fig. 2.

initiated to develop the proper binocular visual skills through her spectacles. Environmental control of working distance for all near-point tasks should be exercised.

(c) Line construction. The type of lines used in constructing the drawing also may provide a number of important visual clues. The ability to make lines on paper shows the following developmental sequence: first, the ability to draw a vertical line; second, the ability to draw a horizontal line; and finally, the ability to draw an oblique or diagonal line. When one considers the servomechanism of hand-

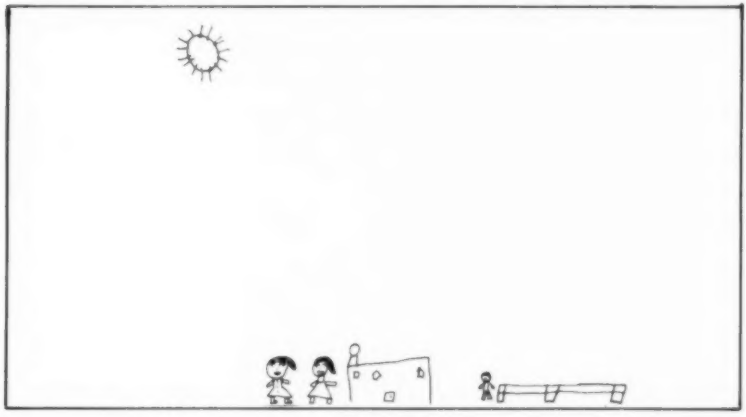

Fig. 3.

arm-shoulder, it is obvious that the vertical movement is the simplest movement that can be made, while the horizontal movement calls for considerable corrective feedback in order to maintain its direction. The oblique movement is an extremely complex movement of the mechanism and calls for maximum control. The following norms should be used as an approximate guide since they are based on children from a metropolitan area with above average socio-economic advantages: Vertical lines—4 to 4½ years: Horizontal lines—5 to 5½ years: Oblique lines—6 to 6½ years.

Gesell[4a] has reported regarding the five year old child:

> He operates with more facility in the vertical direction than in the horizontal. . . . He lacks command of oblique strokes even when he wields a crayon. The vertical line is the easiest for him to execute. Sometimes he draws this with an upward stroke. . . . and he tends to arrange visual-test materials in the vertical meridians to which he is so hospitable.

Regarding the six year old child Gesell[4b] states:

> His eyes differentiate between a vertical and oblique stroke, but, in his effort to execute an oblique stroke with his crayon, he twists his body and shifts his paper at various angles.

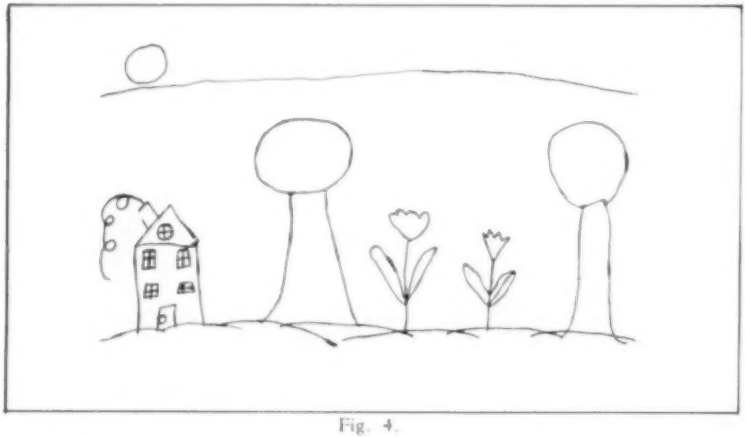

Fig. 4.

Figure 4 is a drawing of a house and garden by an eight and a half year old girl. The clue that the child could not draw an oblique line can be determined by the angle of the chimney to the roof line. These children in order to avoid the use of oblique lines will rotate the paper as they draw and almost invariably they become confused and will draw the chimney as a vertical line perpendicular to the roof. This type of performance is not normal after six and one-half years of age. The writer believes these youngsters will develop very poor visuo-

motor skills which are quite apt to be an important factor in slowing down their reading ability.

(d) The number of objects. A drawing consisting of a single object is a lower order of performance than a drawing consisting of a combination of objects. The number of objects in the drawing must also be balanced against the detail present in the objects. Thus, a child drawing a house but presenting all of the parts would have presented better performance than a child drawing just the outline of a house and having a couple of stick trees present. Multiple objects present in a drawing (with average detail present) usually indicate a higher order of visualization. The highly oral child will often draw a simple figure and present a very detailed oration regarding the drawing. These children often do well in the lower grades and start having difficulty when silent reading is introduced in the third grade.

(e) Perspective. The appearance of perspective in the drawing is a good indication that some stereopsis is present. The drawings made by older children can not be evaluated on this basis since even in their monocularity they develop a more sophisticated attitude and become aware of perspective. This is not always true; for example, C. R., female, age 23, a graduate of the Art Department, University of Illinois, an alternating suppressor, stated that she had considerable difficulty passing her course on Scenic Design. The instructor always criticised her scenic design as lacking in depth. It was only by imitating the work of other students that she was able to pass the course. She never understood her difficulty until after she had received eight visual training sessions; she reported that in looking out of the window that morning she had become aware that the tree was away in space.

The strabismic and/or amblyopic youngster performing the spontaneous drawing test will show immaturity in his drawing with few objects, poor line development and lack of perspective. Figure 5 is a drawing of a train made by a six-year-old strabismic male. Figure 6 is a drawing of the same subject made by the same youngster after receiving his spectacles and twelve visual training periods. You will note the attempt in Figure 6 the patient attempts to indicate depth or thickness to the train.

(f) Directionality. The reading requirements of our civilization require a left-to-right directionality. The child not having this directionality will reverse words, have poor fixations and be retarded in his reading ability. Directionality can be appraised from a patient's spontaneous drawing by observing where he starts on the paper and the direction in which he builds his picture. Inspection of the finished

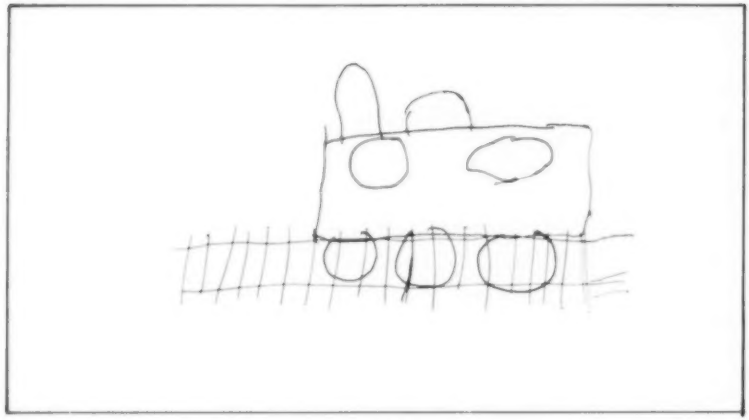

Fig. 5.

drawing will often reveal clues, i.e., the direction of the smoke arising from the chimney, the direction that the train is moving, the direction that birds are flying and the direction that the trees and flowers are bending in the wind. Shepherd[5] in his study of the reading efficiency of 809 average school children reported on the importance of directionality:

> The tendency to reverse and the reading speed were most accurately predicted by the pattern of drawing. Here the subconscious learnings were most accurately ex-

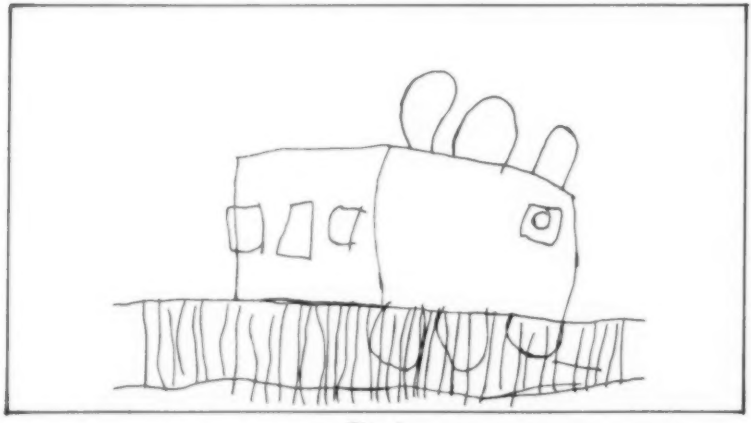

Fig. 6.

pressed. The child might well copy formed figures of circles, squares, and block numbers as he had been taught, stroking the lines from left to right but then do the free-hand figures from right to left. These drawings will not only be stroked from right to left but will then be oriented in that direction, that is, arrows will point left and birds will be pictured flying left on the paper. Statistically, as well as in each individual test, this right-to-left pattern proved significant. We were surprised to find that the tachistoscope was relatively insensitive, showing up only the profound reversers. . . . Not all reversers are slow readers and not all slow readers are reversers, but a sufficiently high percentage of poor readers demonstrated reversing as a contributing cause to make this a prime factor for investigation.

The very young or retarded child or the child with a slow developmental schedule may not be able to make a spontaneous drawing even after being urged to do so. In these cases it is wise to check these children on their ability to imitate a pencil stroke. For this modification in the standard procedure, the examiner scribes a vertical line about one inch from the right margin of the paper and asks the child to make one like it. One of several responses may occur: (a) No Response. Very young child or severely retarded child may simply do nothing. (b) May trace. The fact that the child can trace on top of your line indicates that sufficient hand and eye coordination is present if he has some means of orientation present. (c) Draws a vertical line. This is a normal response and the imitative ability of the child should be tested on the more difficult horizontal and oblique lines. (d) Draws a series of vertical lines. This indicates perseveration which is thought to be present in the brain injured child, the very young child and/or the child with severe visual problem.

If you obtain an imitative response to the vertical line, the writer suggests you continue your investigation by drawing a horizontal line at the top of the paper and have the child draw one like it. If you obtain an imitative response to the horizontal line, draw a diagonal line across the paper and again ask the child to draw one just like it. If the child is not capable of making an imitative copy response of simple lines other paper tests will be too difficult and should be omitted.

TESTING PROCEDURE

(1) Equipment. A desk-chair combination which is adjustable to the correct nearpoint working posture of the child. A package of 8½" by 11" drawing paper. A soft lead pencil (#2), without eraser.

(2) Procedure. The chair should be adjusted for comfortable nearpoint activity. Good illumination, without any glare is essential. A sheet of drawing paper is placed before the child at the midplane of the body and six inches from the edge of the desk. The child is given a pencil and in a casual tone of voice the examiner asks the child to make a drawing. If no response is forthcoming after ten seconds, the request to make a drawing is repeated. If the child asks for a suggested

subject, direct instruction is avoided by the statement, "Draw whatever you care to draw." If after ten seconds no response has started the examiner may suggest some general subjects, for example, "Draw what you have drawn in school." "Make a picture of where you went on your vacation." "Make a drawing of your home." The examiner should not suggest to the child that he draw a man since this type of drawing provides little visual information, although it does supply maximum information regarding intelligence. If the child does voluntarily draw a man the examiner should wait until he is finished with the drawing, remove the picture and now ask him to draw something else. As the name of the test implies, it should be as spontaneous a reaction to the drawing situation as can be devised. The examiner should be certain that the child is thanked for his drawing and paid a compliment on it. The child is then asked to tell about what he has drawn.

(3) Precautions. If the child insists that the mother be present while testing, it is important that the mother be cautioned not to participate in the test by giving the child instructions.

The examiner should not stand over the child as he is doing the drawing. He should be out of the field of sight but in such a position that he can observe *indirectly* the child's performance habits and make notes of these at once.

When the child has stopped his drawing activities, the examiner should ask him if he has finished his drawing. If he indicates that he has finished his drawing he should be asked to sign his work. A compliment should be used at this point.

If the child, after starting the drawing, expresses dissatisfaction with the drawing and wants to erase a portion of the drawing he is told to start over again on another sheet of paper. The first drawing is preserved and record the comments of the child are recorded on it.

The examiner should not give the parent or the child any clue as to the diagnostic importance of the drawing. As far as the parent and child is concerned this is merely an interlude in the testing routine. It is a play reward for the child.

CASE EXAMPLE

Case History. The mother had noted that her younger daughter was constantly blinking her eyes. The child reported no subjective visual symptoms of any nature. The daughter, 5½ years of age, was taken to a vision specialist and his visual report (as stated by the parent) was that the child was free of any eye disease, had a low refractive error which did not need correction at this time and that her visual acuity was normal at far and near. The mother was told to return with the child

in six months. The mother was dissatisfied with this diagnosis and sought another opinion.

The child was seen one week later. There was excessive deep blinking and frequent rubbing of the eyes. The child seemed timid. No subjective visual symptoms were reported.

TABLE 2
Visual Data

# 3	Habitual phoria at far	Ortho
#13A	Habitual phoria at near	Ortho
# 4	Static retinoscopy	O.D. +0.50 — 0.50 x 180° O.S. +0.50 — 0.50 x 30°
# 5	Dynamic retinoscopy at 20"	O.D. +1.75 — 0.50 x 180° O.S. +1.75 — 0.50 x 30°
# 7	Subjective at far	O.D. +0.25 — 0.25 x 30° O.S. +0.25
# 8	Induced phoria at far	2 Exophoria
# 9	True adduction at far	16
#10	Convergence at far	30/8
#11	Abduction at far	10/1
#12	Vertical phoria at far	Ortho
	Vertical duction at far	8/2 & 8/1
#13B	Induced phoria at near	2 Exo
#14A	Dissociated cross cyl.	O.D. +1.50 — 0.25 x 30° O.S. +1.50
#15A	Phoria thru above	4 Exo
#14B	Fused cross cyl.	O.D. +2.00 — 0.25 x 30° O.S. +2.00
#15B	Phoria thru above	5 Exo
#16A	Positive relative conv.	24
#16B	Positive fusional reserve	48/10
#17A	Negative relative conv.	12
#17B	Negative fusional reserve	26/8
#18	Vertical phoria at near	Ortho
	Vertical ductions at near	5/2 & 6/1
#19	Amplitude of accommodation	O.D. 13.00 O.S. 13.75 O.U. 7.00
#20	Positive relative accommodation	—4.75
#21	Negative relative accommodation	+4.25

Visual Data. The visual data are given in Table 2. The habitual acuity at both far and near is 20/20 O.D., O.S., and O.U. Ophthalmoscopy was negative. Rotations and fixations were poor.

Spontaneous Drawing. The spontaneous drawing made by the child is shown in Figure 7. Note the small size of the house in relationship to the size of the figure. Note that the child does show perspective on the roof line and also attempts to draw the house in three dimensions. The drawing distance was never greater than four inches and frequently closer.

Visual Analysis. The child has a hyperopia of low degree at far and reveals more hyperopia at near. The visual pattern is poorly

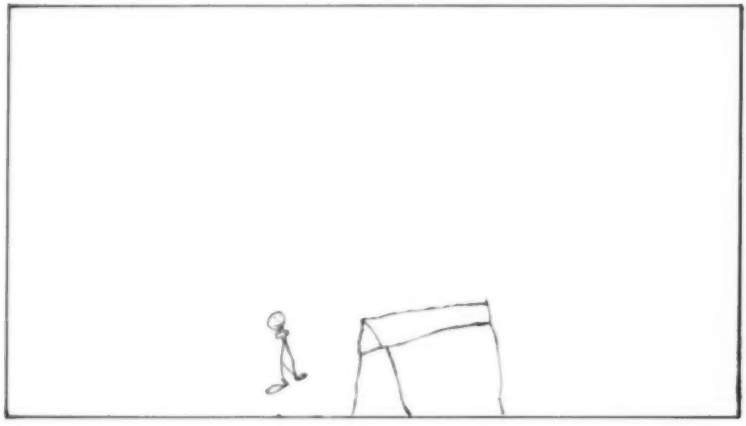

Fig. 7.

organized as shown by the low recoveries found for all of the duction tests. The visual findings reveal an accommodative interference pattern requiring the application of plus lenses. In spite of the fact that the amount of plus that could be prescribed is low, the presence of the poorly integrated visual pattern and the myopic spontaneous drawing dictated that +0.50 D.S. O.U. be prescribed for all nearpoint activities.

Progress Report. The parents were very pleased and reported that the following changes had been noted. The child was no longer blink-

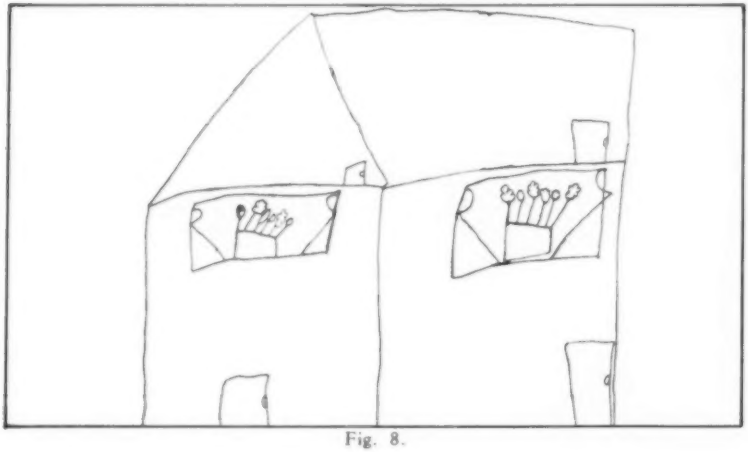

Fig. 8.

ing and rubbing her eyes all of the time. The teacher at school reported that the youngster was participating in school activities to a better degree. The mother reported that the child was sitting more erect at the table and eats like a little lady. The father reported that previously he had never had an opportunity to play with his daughter since by the time he came home the child was asleep. Now, however, his daughter did not fall asleep as soon as she finished her dinner and was awake and active when he got home. The improvement in the child's visual space world can readily be seen when we compare her spontaneous drawing at this time (Figure 8) with the one made three weeks previously. The visual progress is further substantiated by her excellent visual skills which are now above normal for a 5½-year-old child (See Table 3).

TABLE 3
Visual Skills

Motor Skills	
Monocular rotations	Excellent
Binocular rotations	Excellent
Saccadic fixations	Excellent
Near-to-far fixations	Excellent
Near point of convergence	3"
Donders amplitude of acc.	Expected for age
Perceptual Skills	
Farpoint	
Simultaneous perception	Present, vertical alignment
Fusion	Three balls (normal response)
Stereopsis	11 lines correct (missed one)
Accommodative rock (—2.50 D.)	Very short blur on one side
Lateral phoria	Arrow at 10
Vertical phoria	Orthophoria
Visual efficiency of O.D.	90%
Visual efficiency of O.S.	90%
Hand and eye coordination	Normal, slight errors
Nearpoint	
Fusion	Three balls (normal response)
Macular suppression	None present, perfect cross
Lateral phoria	Arrow at 4
Visual efficiency of O.D.	90%
Visual efficiency of O.S.	90%

CONCLUSION

Spontaneous drawings have been used by the psychologists to determine personality disorders and they have been used by the educator to estimate intelligence and to predict reading readiness. As optometrists we should be interested in spontaneous drawing, not from these viewpoints but the writer believes as a means of obtaining visual information. From the spontaneous drawings made by young children the author obtains visual clues as to (1) the organization of the child's visual world, (2) the quality of the child's hand and eye coordination.

(3) the child's visual directionality and (4) the postural misalignments and working distance that may provide information as to possible future refractive changes. A series of spontaneous drawings while the child is under optometric care provides a means of cataloging the visual progress of the patient.

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INSTRUMENT REVIEW

ROBERTS CONTACT BIOMICROSCOPE

A new slit-lamp designed for the contact lens practitioner has been announced by Roberts' Ophthalmic Instruments, Inc., of Moberly, Missouri. The Contact BioMicroscope (CBM) features brilliant illumination and sensitive "joy stick" control. The standard instrument provides 23X and 40X magnification, and simplified 180° slit adjustment.

Introducing the instrument, the manufacturer points out that although the CBM has the sturdy construction, professional appearance, and coated optics found in more expensive biomicroscopes, it is American made and priced far lower than imported types. The Roberts' Contact BioMicroscope will be sold by distributors throughout the United States and Canada, and is priced at $325.00. Further information may be obtained by writing to the company.

R. A. KOETTING, O.D.

HEAT, SUNGLARE AND DUST ARE FACTORS IN CONTACT LENS FITTING IN SOUTH AFRICA*

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This contribution to the Academy program was inspired by the growing international outlook of our organization. I present it in the belief that, although it is not a technical paper and may have little clinical application in this country, the reader may be interested in some aspects of optometry in Southern Africa, with special reference to contact lenses. As has been the case in many other parts of the world, optometry has made considerable contributions to the development of contact lens technique in Africa.

The purpose of this paper is to present some observations on the conditions, climatic and otherwise, which govern the wearing and fitting of contact lenses in those parts of Southern Africa where there is scope for the work, and with which I am familiar.

As an introduction to the subject, something may be said about the territories involved, as they present certain distinctive features which have a bearing on optometric practice. The Union of South Africa, stretching from Cape Town to the Zambesi, is a highly progressive, multi-racial country developed mainly by a small minority of people of European origin, numbering almost 3 million. Of the total population of 13 million, the numerically dominant group is that of the Africans, of whom there are about 9 million. The colored people, of mixed race, number approximately 1 to $1\frac{1}{4}$ million, while the smallest racial group—the Asian group, numbers between 400,000 and 500,000.

The Africans are the most backward so far as the attributes of western civilization are concerned. They comprise hundreds of different tribes and speak four major languages and one minor one. The majority are still very primitive and cannot be compared, as a group, with the negroes of your country, who have, by and large, adopted western ways of life and habits. But the Africans are emerging rapidly into the economy of the white people.

The white group, that of the Europeans, is the most advanced

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and skilled of all, and these people are a permanently settled community. They comprise not only the descendants of British settlers, who arrived mainly from 1820 onwards, and the Dutch who developed into the modern ethnic group of Afrikaaners, but also large numbers of other English-speaking peoples, including over 100,000 Jewish people. Of the white population, 40 per cent are English speaking and 60 per cent are Afrikaaners.

In the larger cities and industrial areas English is the dominant language, but the country and agricultural people cling to Afrikaans, which is similar to Flemish. The two official languages appear on all government publications, and the rail, road and air transport systems of the country are similarly bilingual. On the radio, English and Afrikaans are distinct and separate programs. In professional practice a knowledge of Afrikaans is essential in certain areas, and an advantage almost everywhere. In Pretoria, for example, the majority of patients speak Afrikaans, but in Johannesburg it is possible to conduct a successful practice without recourse to Afrikaans. My own experience confirmed this. On very rare occasions I encountered a patient who could not—or did not wish to—speak English, and in such cases my assistant, who was born in the city, took over.

The Federation of Rhodesia and Nyasaland is situated farther north, in South Central Africa, being bordered by the Union of South Africa, the Bechuanaland Protectorate, Portuguese West Africa, the Belgian Congo and Tanganyika. In these territories the official language is English although a number of vernacular languages are employed in African administration. The population of the British State of Southern Rhodesia (the part of the Federation with which I have some experience) is made up of 176,000 Europeans, 2,290,000 Africans and 13,200 of other groups.

The Europeons are overwhelmingly of British stock consisting of people who migrated from the British Isles or from South Africa, or descendants of such immigrants. Their standard of living is high and very similar to that of South Africa. The vast majority of the Africans still live an agricultural life in their tribal areas.

The scope for contact lens work in both South Africa and Rhodesia is limited to the European population, for the African native, who could ill afford contact lenses in any case, is passionately fond of spectacles, believing them to be a mark of distinction. Many a native woman earning no more than the equivalent of 25 to 30 dollars a month will pay almost that amount for a pair of stylish spectacles, even if she has little real need for them. Patients with high refractive

error are rare among the black people, who suffer more from ocular disease than from purely visual defects.

I was invited only on one occasion to undertake the fitting of a native boy, and the circumstances were rather interesting. I received a telephone message from a well known film producer engaged in the planning of the film version of one of Alan Paton's notable books. He wished to have the boy fitted with contact lenses to give him the appearance of one suffering from corneal ulceration and severe conjunctival injection. Unfortunately I was not able to see him, as the request came on the eve of my departure for England.

There is certainly scope for contact lens work on a charitable basis among natives whose vision has been decimated by ulceration and trachoma—to mention just two of the conditions which result from unsanitary living conditions.

The standard of living of the Europeans of South Africa is high and they are appreciative of such refinements as contact lenses. Indeed, the latest developments in the medical and allied fields are followed with great interest. The surgeon, dentist or physician who fails to keep in close touch with modern developments abroad pays a heavy penalty in a declining practice, while those who are able to offer some new service to their patients very quickly reap the benefit of their enterprise.

The history of contact lens development in South Africa and Rhodesia is quite a brief story by comparison with the record in Great Britain and the United States of America. Interest in the possibilities of contact lenses had been aroused in the years prior to the outbreak of World War II, but it was submerged by the momentous events in Europe. It was partly in anticipation of a surge of public interest in contact lenses that an invitation was issued to me to visit the country after the war, as soon as travel restrictions were lifted.

On my first trip to Johannesburg some hundreds of patients awaited my attention. The first task was that of screening, with a view to deciding which patient's needs were the most urgent. It was evident that there would be a high percentage of difficult ones and these would claim prior attention.

In the first category were those suffering from some pathological or otherwise abnormal condition of the eyes, and for whom contact lenses held some hope of visual improvement. Among these patients were some who had already been seen by European specialists, but who had been prevented from returning by transport difficulties.

As an example of this type of patient I recall a crippled man I

examined in Cape Town on my way north. A sufferer from acute keratoconus, he had been fitted with blown glass contact lenses of extreme delicacy by the famous Müller of Wiesbaden. Unfortunately one of his lenses had been broken. When I refitted him, with plastic lenses, he was good enough to present to me the surviving example of Müller's exquisite work, and it has remained ever since one of my most treasured historic specimens.

By no means all of the first patients were so fortunate as he, for many were the victims of eye diseases for which neither surgical nor optical treatment was practicable.

In the next category fell those whose vocational needs made contact lenses desirable and potentially useful. Mainly men, they were engaged in industries such as gold-mining, one of the most important in South Africa. The supervision of native rock-drill operators at levels down to 7,500 feet below the earth's surface, where temperature and humidity are high, is an almost impossible task for a man dependent upon spectacles. Copious perspiration and condensation make it extremely difficult to keep spectacle lenses clear for more than a few minutes. I was able to demonstrate, in the course of several visits to the lowest workings of the gold mines, the excellent performance of contact lenses in these difficult conditions.

Several of the leading surgeons were interested in contact lenses for use in the surgical operating theatre. One, I remember, had more than 12 diopters of astigmatism.

These vocational applications of contact lenses provided an excellent opportunity for me to gain experience of their performance in conditions quite different from those encountered at home and, in many instances, in circumstances peculiar to the country.

In the third, and largest, group were patients with many types of refractive error who desired, for one reason or another, to dispense with their spectacles for at least part of the time. A high percentage were myopic (and sometimes neurotic) women, who saw in contact lenses a distinct social asset and a chance to become distinctive in their possession of something new and exciting. Not more than 75 per cent of these patients possessed the patience and dexterity to make a success of their lenses, but they all wanted to try.

The ophthalmologists, on the whole, were rather hostile to the wearing of contact lenses, largely because they knew very little about them and were already fully occupied in private and hospital practice.

They were, however, willing to cooperate with the optometrist whose sincerity they respected in the administration of anesthesia needed

for the moulding technique. They considered that contact lens fitting should be carried out only under the supervision of the ophthalmologist.

While he is not prevented by law from using drugs, the South African optometrist rarely resorts to them. Indeed, the majority of those in practice have not undergone any training in pharmacology. In South Africa the optometrist is not State registered and his qualifications are purely voluntary, while in the Rhodesias the position is different, optometrists being registered as medical auxiliaries.

In view of the necessity for anesthesia in the moulding technique, when contact lenses were first introduced in the Union, it was natural that the optometrist should take advantage of the opportunity to collaborate with the medical doctors. Several of the Johannesburg optometrists who had visited the Obrig organization in New York had been initiated into the fitting of the rather clumsy and fairly thick moulded lenses, with deeply arched corneal portions, which were favored by Obrig in the immediate postwar years. As, however, the moulding technique was a deterrent to many prospective patients, there was considerable scope for the lightweight, preformed lenses we had developed in England, and which had given good service.

During the six months of my initial visit I fitted mainly sealed haptic spherical lenses of this type. They were sufficiently thin in finish to be flexible and extremely neat in appearance. Apart from the limitation of wearing time imposed by veiling, they gave, on the whole, more satisfactory service than moulded lenses and afforded good protection to the eyes. In certain respects, as I shall try to show, these lenses were more suitable for African conditions than the type of lenses we are fitting today.

I was pleased to find, on my return to Africa in March of last year, that many patients were still wearing their haptic lenses fitted in 1949 and 1950 with satisfaction. I took the opportunity of refitting a number of these patients with microlenses, so that we could compare the results. In most cases the performance of the modern lenses was superior, although in others the old type, which we now regard as quite out-dated, was preferred.

In considering the application of contact lenses in South Africa and Rhodesia, due regard must be paid to the peculiar climatic conditions of these countries. In the main, these governing conditions which influence the wearing of lenses may be grouped under three headings: (1) Heat, humidity and altitude. (2) Sunglare. (3) Dust. The areas in which temperature and humidity become objectionable are mainly

those of low altitude, especially the coastal districts, although there are exceptions to this generalization. Pretoria, the administrative capital of the Union, has an altitude of over 4,000 feet, and yet its location in a bowl-shaped depression results in the development of high summer temperatures such as are experienced in many American cities.

Pietermaritzburg has a similarly hot climate, although the altitude is lower. Johannesburg, the Union's largest city, is 6,000 feet above sea level, and the temperature rarely exceeds 85 degrees, remaining at that level for no more than two or three weeks in midsummer. The nights are generally cool enough to be quite pleasant.

In these three cities the heat is not noticeably humid. It is rather of a dry type, and therefore less exhausting. However, ventilation is important, and consequently contact lenses which enclose the eyes and shut off the cooling breeze are limited in tolerance. The small corneal lens has an advantage in this respect, but it offers little protection against the entry of dust.

In the coastal cities, Durban, Port Elizabeth, East London and parts of the Cape, high temperature and humidity are combined. The heat is of the "sticky" variety and can be very trying. In these conditions the best kind of lens is one which affords good ventilation without aggravating photophobia. Fenestrated haptic lenses give reasonably good performance so long as their apical clearance is adequate. But whenever settlement becomes excessive, so that the degree of corneal touch is more than capillary, tolerance falls and discomfort arises. Sealed haptic lenses can be worn in these conditions, but the solution with which they are filled deteriorates very quickly due to the high humidity. A fairly high proportion of tinted lenses is employed.

It cannot be claimed that tropical heat is an ideal climatic condition for the wearing of corneal lenses, although when accurately fitted their general performance is comparable with that enjoyed in Europe. Excessive tightness, or the kind of fit which causes the development of tight symptoms, becomes evident in a burning or smarting sensation accompanied by lacrimation and general conjunctival injection. Humid heat is often physically exhausting and one is less inclined to tolerate even slight ocular discomfort. Accuracy in fit is therefore an important consideration in the successful use of corneal lenses in these latitudes.

Sunglare is quite a problem throughout the Union, but it is most troublesome at the coast, where the beaches are very light in color and the silver sand and glistening water reflect glare.

In Johannesburg, at 6,000 feet, the air is remarkably clear and the wearing of sunglasses during the day is almost universal. The daily

sunshine average, winter and summer, is about nine hours. Add to this the problem of dust, and it will be appreciated that apart from the limitation imposed by veiling, sealed haptic lenses give the best protection to the eyes.

Many patients originally fitted with this type of lens were attracted by the comparative simplicity of microlenses, only to find that the abrasive effect of dust particles severely interfered with comfort and intensified light intolerance.

During my visit of last year I encountered quite a number of patients who, while happy enough in their corneal lenses indoors, had serious problems in their outdoor activity. The experience of one of them will illustrate the kind of dilemma in which they found themselves.

A young surveyor in government service was in charge of road engineering work in the country areas. It was his task to supervise road construction and he was obliged to make fairly long journeys to inspect work in progress. He suffered from keratoconus and contact lenses were his only means of securing good vision. His tolerance of sealed haptic lenses was limited, by veiling, to about five hours, but they were comfortable and effective as a protection against the clouds of dust in which he had to drive.

He had been fitted with corneal lenses, which performed well only when he wore protective goggles in addition. In the heat of the day the goggles were a nuisance, as they steamed up and interfered with the ventilation of his eyes. When he tried to do without them, his eyes filled with dust, and the abrasive effect caused great discomfort, with consequent intensification of photophobia. Not infrequently, after irrigating his eyes with lotion, he was obliged to revert, gratefully, to his old fluid-filled lenses.

In such cases there is no simple solution to the patient's problem, for each type of lens has peculiar limitations. In the case of the surveyor, adjustment of his old lenses to provide the maximum limbal clearance was successful up to a point, in that it delayed the onset of veiling, and that was as much as one could do to help him.

A similar problem is revealed in a report I received recently from a patient in Chunya, Tanganyika. I fitted him with microlenses last year. He writes:

> In this part of Africa I find that the sunglare is many times more strong, out of doors, even on an overcast day, than on the most brilliant of English days. Sometimes dark spectacles are necessary in addition to my tinted lenses. But perhaps the worst problem is the clouds of dust one meets on the roads. The dust gets into everything.

Despite the unfavorable conditions, however, the successful use

of microlenses is possible when the patient makes an intelligent effort to adapt himself to them. He must realize, for example, that when wearing corneal lenses his eyes are not so well protected as they were by his spectacles. He will, of course, have been reminded of this fact in the course of his instruction. And so he quickly learns to take precautions against the entry of foreign bodies.

Adequate protection against sunglare, when corneal lenses are worn, demands a much deeper tint than would be necessary in a spectacle correction, and this fact must also be taken into account in African conditions. The reason for the difference is that a spectacle lens (even in clear glass) absorbs between 7 and 10 per cent of transmitted light. A tint is therefore more effective, in a spectacle lens, than its appearance would suggest.

Driving along the main highways of South Africa there is no real problem from either glare or dust, for they are well-surfaced roads of non-glossy tarmac. On the secondary roads, however, conditions are very different. Mainly "dirt" roads, they develop "washboard" surfaces and in the dry season dense clouds of dust are generated by the vehicles. The red dust penetrates everywhere, even into sealed luggage compartments, and its abrasive effect is nowhere more troublesome than in the eyes.

In Southern and Northern Rhodesia the main highways consist of a nine-foot strip of tarmac with a similar width of dirt road on either side. The paved section is well surfaced and permits high-speed driving with very little dust, but in order to pass other vehicles, in either direction, it is necessary to drive with two wheels on the dirt section, raising a great deal of dust. When the traffic is considerable one is compelled to drive in dust clouds all the time, and in these conditions the wearing of contact lenses is difficult.

Nor is the dust problem confined to country areas. In Johannesburg, dust from the mine dumps (man-made mountains built up from the discarded material excavated from the underground workings) mingles with that of the dry city streets to provide an endless supply of air-borne foreign bodies! The particles from mine dumps are sharp enough to lodge in the epithelium of cornea and conjunctiva, resisting the flow of lacrimal fluid which would wash away the less abrasive foreign bodies. And while protection may be afforded by the wearing of sunglasses, many patients prefer prescription-ground sunglasses to the combination of plano ones with contact lenses.

An English optometrist spending six months in a Natal practice wrote to me to express his agreement with some statements I made in an

article for the DIOPTRIC NEWS on African conditions. He wrote, "The August winds have started here and dust is blowing everywhere. I entirely agree with you that this is not the season for microlenses."

The early corneal lenses with which I experimented in Johannesburg in 1950 were considerably larger in diameter than the type we use today, and they protected the cornea more effectively. A few of the patients since fitted with modern lenses have expressed the view that the old ones, despite their limited tolerance, were more generally successful because of their comparative freedom from foreign body trouble.

Perhaps I have rather over-emphasized the difficulties which beset the contact lens wearer in Africa. It would, however, be an entirely unwarranted conclusion to assume that contact lenses are not a practicable proposition. There are thousands of patients who regard their lenses as thoroughly worthwhile and who value them highly, in almost every part of the territory I have covered.

The problems and difficulties encountered in African conditions have their compensation in the rewarding appreciation shown by patients and by the satisfaction enjoyed by the practitioner in the measure of success he achieves.

I would summarize these somewhat random observations in three main conclusions:

1. No single type of contact lens will give completely satisfactory service in the varied conditions encountered in Africa. The practitioner must be familiar with the fitting of every type of lens and be prepared to adapt his methods to the special needs of his patients and to the conditions in which they are situated.

2. The most advanced design of lens for European conditions is not necessarily the best for the patient in Africa, for several types which have been superseded in Europe and America offer better all-round performance there.

3. The percentage of completely successful cases is lower than in the European countries, due to climatic conditions which, because they are peculiar to the country, must remain an unavoidable hazard and a challenge to the conscientious practitioner.

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INSTRUMENTATION AS A REFLECTION OF A NEW TREND IN CONTACT LENS FITTING

An interesting basis for assessing optometrists' thinking at a given time is to note their equipment-buying patterns. A few years ago there was great demand for accurate ophthalmometers and keratometers. This was a reflection of the trend for the practice of contact lenses to become part of general optometric practice. An important datum in fitting corneal lenses is the corneal radius, and the newer techniques for fitting contact lenses call for precise measurements. Thus, as optometrists entered the contact lens field, they found that their older ophthalmometers which had been accurate enough for determining the difference between corneal meridians were not accurate enough to measure the radii with precision. Hence, the great demand for newer instruments.

Today, according to a recent survey conducted by the author in California, almost every optometrist has an accurate keratometer or

ophthalmometer, so the demand has subsided. In its place, however, there is a tremendous demand for split-lamp and corneal microscope combinations. About a fourth of the optometrists we questioned owned slit-lamps; an additional 50 per cent had slit-lamps on order or planned to buy them within the near future. Thus, very shortly, the slit-lamp and corneal microscope seem destined to become a part of every optometrist's equipment.

What do these trends tell about optometrists' thinking? We believe they reflect a change in thinking about contact lenses. During the past few years emphasis has been upon accurate measurement in the fitting of the lenses. Today, the fitting of contact lenses, insofar as comfort for all-day wearing is concerned, presents few problems in most instances. However, optometrists are now thinking beyond the mere mechanics of fitting for comfort. They are thinking about the long range effects of contact lenses on corneal tissue.

The slit-lamp enables the optometrist to study the minute structure of the cornea. Optometrists are concerned with the long range effect which contact lenses may have upon the integrity of the patient's corneal tissue. The optometrists' instrument-buying pattern reflects his cognizance of the importance of this phase of the problem.

When it became apparent that the corneal contact lenses could be fitted in such a fashion as to give the patient comfortable all day wearing, a few practitioners became carried away. Realizing that marked changes in refraction were rare after adolescence, these men told their patients that the lenses which were fitted would last a lifetime. Unscrupulous or misinformed commercial practitioners in all branches of the eye field advertised contact lenses at one price to cover a lifetime service.

The fitting procedure used by these commercialists consisted of measurement of the corneal radius, determination of the refractive state, and ordering of a pair of lenses. The patient was taught (often by a lay person) to insert and remove lenses and was sent on his way.

Some optometric thinkers with many years of experience with contact lenses and with much study of the anatomy and physiology of the cornea expressed concern about such procedures. The lack of follow-up was also a serious worry to many. Today, most optometrists share this concern.

Thus, contact lens fitting seems to be entering a new phase. The wild claims which heralded innovation have died away. Optometrists have accepted and adopted contact lens fitting as a part of general practice. Most optometrists are doing more than measuring the cornea and

teaching the patient how to insert and remove lenses. They are proceeding cautiously and studying the cornea carefully as the patient adapts. They are not merely listening to symptoms and altering lenses to alleviate these, but they are observing the cornea and trying to fit a lens which will have no harmful effect. They are not promising lifetime service but are warning patients that the lenses and the eyes should be examined at frequent intervals. In our survey of current contact lens practices, we found that the majority of optometrists feel that an adapted contact lens wearer should be re-examined at least every six months in the patient's best interest. Optometrists are almost unanimous in feeling that a contact lens wearer should not go over a year without being re-examined.

Optometry has met the challenge offered by contact lenses in a fashion worthy of professional men. In spite of the wild claims of a few, in spite of the exploitation of the field by a few commercialists, in spite of apathy on the part of medicine and the public to stop laymen from fitting contact lenses, optometry has pursued a clear, sound course. Optometrists have studied new techniques. With their background in physiology and anatomy of the eye and their knowledge of general physiology they were able to integrate the newer techniques into their mode of practice. With the patient's welfare uppermost in their minds, optometrists worried about making contact lenses safe and proceeded with great caution. The manner in which the majority of professional optometrists have met this challenge, more than any other recent occurrence, indicates the maturity which the profession has attained.

MONROE J. HIRSCH

BOOK NOTICE

PRESCHOOL VISION. Richard J. Apell O.D., and Ray W. Lowry O.D. Copyright 1959 Gesell Institute of Child Development, New Haven, Connecticut. Published by The American Optometric Association, Inc., 4030 Chouteau Ave., St. Louis 10, Missouri. 189 pages, reference tables, illustrated, cloth. $7.50.

The reviewer feels compelled to give some background to the reader before analyzing the book in question.

Historically, optometrists have dealt chiefly with adult patients and only in the last generation or two have parents been encouraged to avail themselves of professional eyecare for their youngsters; then only in the age groups beginning at about seven. At this point two things

were obvious, namely (1) that methods used (regardless of the patient's age) were based on studies of the mature adult eye, and (2) corrective procedures were followed after the damage was done. The point is simply this: no thought was given to preventive eyecare and eyecare programming. This fact bothered many men in optometry and in individual offices throughout the country experimentation progressed on an individual basis. Finally, the research at the Gesell Institute began making control type scientific investigations: here men of the several disciplines namely optometry, medicine and psychology worked side by side. It became evident that any preventive work must begin on the preschool level and this is exactly the area in which the studies have been made during the past decade.

About three years ago various groups throughout the country began taking what information was obtainable from the institute and disseminated it to optometrists in private practice. As one might suspect, after a period of time some confusion arose where same practitioners obtained the information third and fourth handed; also as experience was gained, the researchers modified and added to the material given out earlier. By 1959 something authoritative had to be put down in black and white regarding the subject so that this thing could either be carried on more intelligently and uniformly or dropped entirely. The Gesell Institute, American Optometric Foundation, and the American Optometric Association came to the rescue this year with the publishing of the book, *Preschool Vision*.

This book was written "primarily for use by practicing optometrists." The main divisions are:

I. Conducting the examination (reception room, the appointment, meeting the child, transition to examining room, the examination, parents' role, praise, child's questions, negative behavior, do's and dont's in technique, parent interview, sources for test materials);

II. Description of Tests (priority of tests and lists of tests, i.e., Basic, Keystone, Developmental);

III. The Ages—21 months to 5 years (description of age, developmental factor, techniques, expecteds);

IV. Achievers and Non-achievers (definition, differentiation, summary);

V. Activities of the Ages (play defined, activities—toys, books, play materials);

VI. Visual Care and Guidance (programming visual care, developmental lenses, deviations, conclusions).

The book is well written and gives a step by step approach to the subject, which it seems is necessary at the present time, so that those interested in developmental vision can get in step with the experts in this phase of optometry. It is the opinion of this reviewer that all in optometry would be enriched by reading this text, whether the practitioner is interested in doing developmental work or merely desires to refer such cases to those schooled in this most interesting phase of optometry.

JOHN W. HIER, O.D.

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SPECIAL REPORT

VISION INFORMATION PROGRAM

With the introduction, shortly after the first of April, of brochures and application blanks to all members of the AOA in the 50 states, the Vision Information Program began its active service to optometry. This non-profit corporation was established in Indiana after a year and a half of experimentation in that state. It is headed by Dr. Gordon G. Heath as president, faculty member of the Division of Optometry at Indiana University. The main activity of the organization is the Vision Certificate Bureau.

The vision Certificate is designed to provide a multiple service for optometrists, their patients, and the general public. To obtain the certificates an optometrist must become a member of VIP at a nominal annual fee of $5. Upon receipt of his certificates he begins issuance of them to his patients and returns a copy to the VIP. This copy becomes incorporated in the IBM statistical system established at the Vision Certificate Bureau in Indianapolis. At the end of two years, if the patient has not returned for re-examination and been issued a new certificate to replace the old one, the Bureau copy is voided and returned to the patient with the advice to see his optometrist for a new certificate.

The Board of Directors, which serves without remuneration, consists of nine optometrists from the Indiana Optometric Association which began the Vision Certificate as an experiment more than two years ago. The program has received generous acceptance by those men who have been utilizing its multiple advantages in their practices.

The program has been developed with the knowledge and cooperation of many leaders of optometry nationally, including the AOA.

since it began operation. Its primary objective is to improve the professional standards of optometry and provide a substantial form to remind patients of the professional services received from their optometrists. The wide extension of this knowledge to patients and thru them to the general public, also serves as a broadly conceived program of public education about the extent and completeness of optometric services.

The publication of statistics in the years ahead gleaned from the copies filed with VIP will provide an invaluable source of information about patients and the extent of optometric services. The use of this statistical information, in a published form only, does not violate the confidential relationship of doctor and patient. No accessibility to this information is obtainable except by either doctor or patient or both. Statistics released will be only totals and will not pinpoint individuals.

Since the first announcement some days ago by Dr. Henry Hofstetter, who is Director of the Vision Certificate Bureau of the VIP, many inquiries have been coming into the home office in Indianapolis. The brochures sent to all AOA members explain the program in some detail and provide an application card. The introduction to the program is thru a New Members Kit which provides a 50 certificate supply of the Vision Certificate as well as other necessary materials to begin the program.

All inquiries should be addressed to V. I. P., 427 Bankers Trust Building, Indianapolis 4, Indiana.

GORDON G. HEATH

TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

FIRST PRINTING OF GLAUCOMA BY SHLAIFER SOLD OUT. SECOND PRINTING NOW AVAILABLE

Optometrists everywhere will be pleased to learn that the latest Academy-sponsored book, *Synopsis of Glaucoma for Optometrists* by Arthur Shlaifer, was completely sold out within ten weeks of its publishing date. The entire first printing was snapped up so quickly that for a short period our publisher was actually unable to supply the book.

A second printing has now been made and an ample supply exists

for all optometrists everywhere. In the U.S.A. orders for the book should be sent to the Burgess Publishing Company, 426 South Sixth Street, Minneapolis 15, Minnesota. Canadian optometrists should order their copy from the McAinsh and Company, Ltd., Toronto 7, Ontario, and in England, Scotland and Ireland, and the overseas British Commonwealth the orders for the book should be sent to the Mayflower Publishing Company, Ltd., London W.C.2, England. The cost of this book is $5.00 or its equivalent in foreign currency.

Like all of the Academy post-graduate programs, this book fills a long-felt need in optometry, and those who ordered it early were so enthusiastic that their praises caused others to buy it at once. The phenomenal sale of this volume indicates that thousands of other optometrists will equally benefit by owning and using it regularly. The book should be read and then kept in full view in the refracting room where its presence on the desk of the optometrist will do much to assure patients who are apprehensive regarding this pathology. If you haven't secured your copy, order it today from the publisher, or his Canadian or English agents.

CAREL C. KOCH

ACADEMY VACATION TOUR IN HAWAII

Early in April Academy members were invited to take part in a post-convention trip to the Hawaiian Islands, the fiftieth state of the U. S. A. As planned, a group of Academy members, with their wives and guests, will travel together by plane to the Hawaiian Islands. There they will spend two weeks in a glorious vacation which will include special trips to every part of the Islands. A similar Academy vacation trip was made to Mexico after our Houston Convention and those who took that tour came back enthusiastic for another. Many close and lasting friendships were made by vacationing together and it is anticipated that this will be repeated after our coming convention in San Francisco, December 7-13. This year it is hoped that at least one hundred persons will relax in this fabulous vacationland following the stimulating but vigorous convention week.

Those going on the Hawaiian tour will leave San Francisco on December 14th and return to their homes in time for the New Year's celebrations, fit and ready for the usual January rush of patients.

If you haven't already written for a detailed prospectus of the tour, address your request to Mr. Martin J. Kupper, Sedard World

Travel Service, Inc., 137 South Seventh Street, Minneapolis 2, Minnesota. Full particulars for this fine vacation will be sent you at once.

RUDOLPH EHRENBERG

CURRENT COMMENTS

Terry Judith Parkins
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department; such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

THE A.O.A. MEETING IN ATLANTA

The speakers and their subjects at the 63rd Annual Congress of the American Optometric Association, Biltmore Hotel, Atlanta, June 26-29, will be as follows:

Contact Lenses. Neal J. Bailey, O.D., Columbus.
Aids for Partially Sighted. Alfred A. Rosenbloom, O.D., dean, Illinois College of Optometry, Chicago.
Refractive Procedures. Merrill J. Allen, O.D., Ph.D., Division of Optometry, Indiana University, Bloomington.
Practice Management. Frederick Kushner, O.D., Sheldon, Iowa.
Visual Training and Reading Achievement. Harold M. Haynes, O.D., Pacific University, College of Optometry, Forest Grove, Oregon.
Dispensing Procedures. John Archer, O.D., Los Angeles College of Optometry, Los Angeles.
Detection of Pathology for Referral. Paul F. Shulman, Illinois College of Optometry, Chicago.
Vocational Prescribing. Charles A. Abel, O.D., Los Angeles College of Optometry, Los Angeles.
Pre-School Vision. R. W. Lowry, Jr., Worthington, Minnesota.
Economics of Optometric Practice. Myron L. Shoffner, O.D., Los Angeles.
Professional Salesmanship. Louis Jaques, Sr., O.D., Los Angeles.

In addition, a symposium on "Vision Care of the Aging" and of speakers for the military section, educational program plans are complete for the 63rd Annual A.O.A. Congress at the Biltmore Hotel in Atlanta.

Dr. Ralph E. Wick, chairman, A.O.A. Committee on Vision Problems of the Aging, will moderate the symposium, which will be held from 9:30 A. M. to 12 Noon on Monday, June 27.

Theodore T. Dorman, of the Special Staff on Aging, U. S. Department of Health, Education and Welfare, will lead off with background and introduction of a theme for the program. He will discuss the 1961 White House Conference on Aging.

In the next presentation, William C. Fritch, executive director, American Association of Retired Persons, will discuss how the individual

can best help in the solving of the problems related to retirement.

Dr. Harry Kaplan, of Philadelphia, will be the third speaker. His topic will concern the role of the optometrist in the homes for the aged. He will cover special types of eye examinations and services for patients.

The final speaker, Dr. Alfred A. Rosenbloom, Dean, Illinois College of Optometry, will tell of private agencies now working with sub-normal vision problems. Sub-normal vision aids will be included in his discussion.

Dr. Felix A. Koetting, St. Louis, Mo., chairman of the A.O.A. Social and Health Care Trends Committee, will lead off the discussion.

The Military Section's program starts with a session between 10:00 A. M. and 12 Noon on Monday on "Military Philosophy Concerning Contact Lenses." Captain Mancel W. King, MSC, USA, will be the instructor at this time.

The next event on the military optometry program will be a Military Breakfast from 7:30 to 9:00 A. M., Wednesday, June 29. Addresses by the following will be heard at this time: Colonel Roy D. Maxwell, MSC, USA, Chief Medical Service Corps, U. S. Army; Captain Leo J. Elsasser, MSC, USN, Chief, Medical Service Corps, U. S. Navy; Colonel Leonard P. Zagelow, USAF, MSC, Chief, Medical Service Corps, U. S. Air Force.

Military Optometry workshops on "Professional and Administrative Problems" will be held from 9:00 A. M. to 11:00 A. M., with the following in charge: Navy—Commander Robert L. Henry, MSC, USN; Army—Lt. Col. John W. Sheridan, MSC, USA; and Air Force—Major Floyd M. Morris, USAF, MSC. Each of the above military events has been recommended for Military Reserve Credit Points. The following regular educational courses to be held during the Congress have likewise been proposed for credit: Contact Lenses (1A-1)—Neal J. Bailey, O.D., instructor; Detection of Pathology and Referral (1B-3)—Paul F. Shulman, O.D.

List of Commercial Exhibitors at 1960 Congress

American Contact Lens Equipment and Supply Company
American Optical Company
Armorlite Lens Company, Inc.
Art-Craft Optical Company, Inc.
Bausch & Lomb Optical Company
Continental Optical Company
Cummins-Robertson, Inc.
Garvin's, Inc.
Hudson Optical Corporation
Kelley & Hueber, Inc.
F. & F. Koenigkramer Company
Kono Sales Company, Inc.
Liberty Optical Mfg. Co., Inc.
Marine Optical Mfg. Co.
Modern Optics
Optometrics
The Opticase Company
A. B. Pervis Optical Supplies
The Plastic Contact Lens Company
Precision Cosmet Company, Inc.
Raybert Corporation
Roberts' Ophthalmic Instruments, Inc.
Robertson Optical Laboratories, Inc.
Shuron Optical Company
Styl-Rite Optics, Inc.

Titmus Optical Company, Inc.
Trans-World Eyewear Corporation
Tura, Incorporated
John Tworoger
U. S. Safety Service Company
The Univis Lens Company
Victory Optical Mfg. Company
Vision-Ease Corporation
Vision Information Program
Vogue Optical Mfg. Co., Inc.
Wren Optical Company
Younger Manufacturing Company
Zylite-Products, Inc.
Zylo-Ware Corporation

ENTERTAINMENT AT CONGRESS

A family outing, including a spectacular water ski show and a monster "picnic," at a fabulous new water sports recreation center will be the entertainment highlight of the 63rd Annual A.O.A. Congress in Atlanta, June 26-29.

Plans for the event, to be held on Monday, June 27, at the multi-million dollar new Lake Spivey area, only 17 miles by the South Expressway from the heart of Atlanta, were announced by Dr. Edwin H. Ashendorf, Congress general chairman.

Arrangements have been completed by Dr. Robert H. Thurmond, transportation chairman, for a fleet of 30 air-conditioned new "City Slicker" buses to move the more than 1,100 registrants from the Biltmore Hotel headquarters to and from the recreation area.

Tentative departure time for the buses is 3 P. M. The water ski show by a troupe of nationally-famous performers will start around 4:30 P. M. and run until 5:15 P. M. The picnic will start some time later, allowing the conventioneers ample time to cavort and enjoy themselves both before and after eating. The meal will consist of a feast for a king, including Southern fried chicken, baked ham, Brunswick stew, green beans, potato salad, fresh fruit salad bowl, assorted relishes, home-made cake squares and iced tea.

For those who need to return to Atlanta early there will be buses leaving at periodic intervals after the picnic.

The new Lake Spivey recreation center is located within a stone's throw of Tara, mythical home of Scarlet O'Hara, made famous in Margaret Mitchell's book, "Gone With the Wind." It consists of 1,800 acres of water and woodland. The clear spring-fed lake covers 650 acres —twice the size of downtown Atlanta. It has 14 miles of winding shoreline and two beautiful beaches with over one mile of glistening white sand.

Lake Spivey is an amusement paradise for all members of the family alike. Hundreds of picnic tables in cool, shady spots overlook water activities.

The varied attractions also include water skiing, miniature golf, speed-boat rides, sailing, rides in paddle and bicycle boats in a protected canal, and sailing.

For the kiddies there is fun galore, in fact, an entire amusement park. Children and adults alike will love the mile-long ride on the steam locomotive, or the lake tour on the beautiful 75-passenger "Spivey Queen."

The center's facilities are large enough to accommodate 15,000 persons at one time. These include two beaches—the East Beach and the West Beach. The A.O.A. party will have exclusive use of one entire beach.

There is a glamorous new Hilltop Pavillon and Lakeside Amphitheatre overlooking Rainbow Bay. Here conventioneers may dance, play games, or chat with friends. The picnic patio, also just opened, is located in a lovely pine grove overlooking the lake.

All Congress registrants should come prepared—with swimming suits and sports clothes—for a delightful outing—one that will be remembered a long time.

FRY HONORED AT OPTOMETRIC MEETING

Presentation of an engraved silver bowl to Dr. Glenn A. Fry, Director of the School of Optometry, Ohio State University, in recognition of twenty-five years of service to the School and to the profession was a surprise highlight of the 13th Annual Forum of Children and Youth held in Cleveland, February 26-28.

The presentation was made during the Fellowship Dinner by Dr. Nelson Abrahamsen, Sr., Cleveland. He warmly praised Dr. Fry for many achievements in his official connection with the University. He also stated that the gift to Dr. Fry was from his friends and alumni attending the Forum. The bowl was engraved: *"OSU, To Professor Fry, 1935-1960."*

Doctor Fry first joined the faculty of the Ohio State University as assistant professor of physiological optics in 1935. He became associate professor in 1942, and professor in 1946. Later in 1946 he was named as director of the School of Optometry, and from 1949 to 1956 he also served the University as Co-director of the Institute of Research and vision.

In addition to his administrative duties at the University, Dr. Fry has made numerous contributions to many professional and scientific organizations of which he is a member.

TOPAZ HONORED AT MANUFACTURERS DINNER

About 135 ophthalmic manufacturers and guests gathered at the Waldorf-Astoria Hotel in New York City on the evening of January 20 for a surprise testimonial dinner to honor Martin Topaz, editor and publisher of THE OPTOMETRIC WEEKLY, on the publication's 50th Anniversary.

The dinner came as a surprise to Martin Topaz who was in New York for a meeting of the Optical Manufacturers Association on the following day. Arrangements for the dinner were handled by a special committee of manufacturers who worked for months in secrecy. A number of wires from people who could not attend the meeting were also read at the dinner event.

Special invited guests on hand to pay tribute to Martin Topaz includes: Dr. P. N. DeVere, president, American Optometric Association, and Mrs. DeVere: Dr. Lawrence Fitch, president, American Academy of Optometry, and Mrs. Fitch: Leon Totten, president of the Optical Wholesalers National Association, and Mrs. Totten: Emanuel Nathan, president of the Optical Manufacturers Association: Maurice Cox, editor and president of the OPTICAL JOURNAL AND REVIEW OF OPTOMETRY, and his associate, Peter Markey: and Roy P. Stealey, managing editor of the *Optometric Weekly*. Mrs. Martin Topaz also was a guest of honor in surprise to her husband.

A silver bowl suitably engraved with the message of his friends in the ophthalmic industry was presented to Martin Topaz by Herman Lieberman, a member of the committee, and a long time personal friend. Special testimonial remarks were offered by Roy Marks, president, Shuron Optical Company and A. K. Marsters, executive vice president, Bausch & Lomb Optical Company.

TITMUS OCCUPATIONAL VISION TEMPLETS

New job standards templets developed by Titmus Optical Company, for use with the T/O vision tester, permit the user to grade instantly each employee's visual performance, in relation of the visual needs of six principal job categories.

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NEWS BRIEFS

At a recent meeting of the board of trustees of the Pennsylvania State College of Optometry Dr. Lawrence Fitch was elected president and dean of the college. Dr. John C. Neill, Philadelphia, was named

vice-president. Dr. John D. Perry, Winston-Salem, North Carolina is chairman of the board. . . . The Plastic Contact Lens Company, Chicago, has arranged for a schedule of five special courses in contact lens manufacturing. These courses, ranging in length from two to 16 weeks, will cover the manufacturing processes used in making contact lenses. Dr. Edward W. Lenzen is educational director for the company and the courses are open to laboratory owners and staff people. . . . Dr. Turner O. Veith, Tenafly, New Jersey has been appointed director of the Contact Lens Division of the Titmus Optical Company, Petersburg, Virginia. . . . Dr. Arthur Shlaifer, associate professor of Optometry and ocular pathology at the Pennsylvania State College of Optometry, was the speaker at a meeting of the Eastern Pennsylvania Chapter of the American Academy of Optometry, March 16. He discussed his recently published book, *A Synopsis of Glaucoma for Optometrists*. The meeting was held in Philadelphia at the home of Dr. John C. Neill.

Largely as the result of informal gatherings at the last two meetings of the American Academy of Optometry, a group of Industrial Optometrists from civil service and private industry have gotten together and are making plans to attend the Industrial Vision Conference of the American Optometric Association that will be held in the Fall of this year. They will then organize and hold their first annual meeting. A directory of Industrial Optometrists is being prepared. Interested optometrists should write to Dr. John C. Hill, Industrial Optometrist, Norfolk Navy Shipyard, Portsmouth, Virginia, for additional information. . . . According to Edward K. Hueber of Kelley & Hueber, Inc., Philadelphia, the company has again received the government contract for spectacle cases for the armed services. The armed services have developed extremely high standards for spectacle cases and the Kelley & Hueber people are very pleased that they have been again selected to make these cases as they have for the past 10 years. . . . The annual summer optometric post-graduate course sponsored by the Saskatchewan Optometric Association will be held at the University of Saskatchewan, Saskatoon, May 16-20. Thirty clinical hours of instruction will be given by the faculty. Dr. Gordon L. Walls, School of Optometry, University of California, Berkeley, will be the visiting lecturer. Dr. Michael F. Stadnyk, 307 Avenue Building, Saskatoon, Saskatchewan, is in charge of registration.

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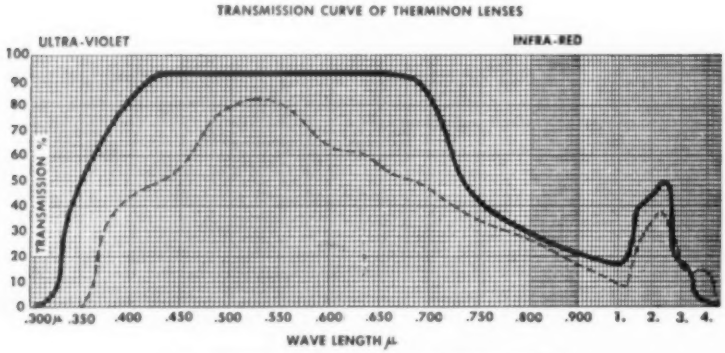

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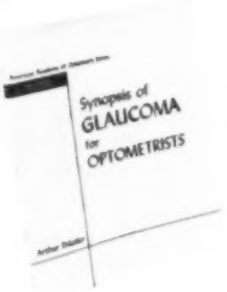

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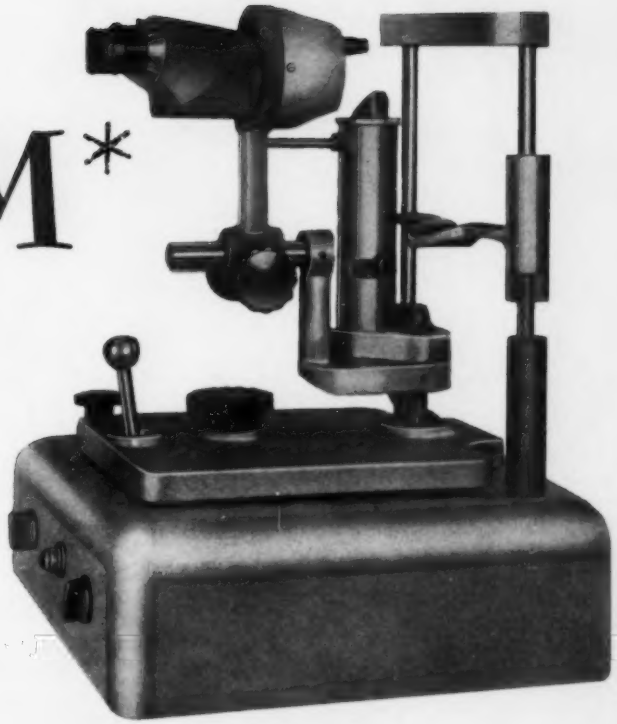

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